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COMPETITION AND MARKET POWER: A CRITICAL REASSESSMENT IN LIGHT
OF RECENT CHANGES

CONCURRENCE ET POUVOIR DE MARCHÉ: UNE RECONSIDERATION
CRITIQUE A LA LUMIÈRE DE CHANGEMENTS RECENTS

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Table of contents

Acknowledgements.....	3
General introduction.....	14
Theoretical approach and methodological choices	20
Structure of the thesis	24
Part I - Competition and market power: lessons from theories and history.....	27
Introduction	27
Chapter I: A short history of capitalistic forms of competition in the United States	29
Introduction	29
1 Predatory competition (circa 1840s to 1860s)	33
2 Collusive competition (circa 1870s to 1910s)	44
3 Constricted competition (circa 1920s to 1945)	54
4 Fordist Competition (circa 1945 to 1970s)	65
5 Finance-led competition (circa 1980s to present).....	79
Conclusions	97
Chapter 2: A critical cartography of competition theories	101
Introduction	101
1 Competition and the labor value theory: the Marxian tradition.....	106
1.1 The central role of competition in the Marxian branch of the classical tradition	106
1.2 The mechanisms of competition in Marxian theory	109
1.2.1 Intra-industry competition.....	110
1.2.2 Inter-industry competition.....	112
1.3 Further developments in Marxian competition theory: the administered prices and normal cost pricing theories.....	114
1.4 Some concluding comments regarding the Marxian competition theory and its further developments	119
2 Neoclassical competition theories.....	122
2.1 Efficient equilibrium and the firm in general equilibrium theory	123
2.2 Perfect competition	124
2.3 The Chicago School and the notion of contestable markets	127
2.4 Modern property rights theory and incomplete contracts.....	130

2.5	Some concluding comments regarding neoclassical competition theories	131
3	Imperfect Competition and Monopoly Capital theories.....	133
3.1	Monopoly Capital competition theory	134
3.2	Imperfect competition theories: the Harvard School's and mark-up pricing theories	137
3.3	Some concluding comments regarding Monopoly Capital and Imperfect Competition theories 141	
4	Transaction Cost Theory and the hold-up problem.....	144
5	Evolutionary economics competition theories: the Austrian and the Neo-Schumpeterian traditions 147	
5.1	A common ground between Austrians and Neo-Schumpeterians: an evolutionary the theory of the firm.....	148
5.2	Competition in the Austrian tradition	151
5.3	The concept of selection environment in the Neo-Schumpeterian tradition.....	153
5.4	The long-run profit rate differentials cleavage in Evolutionary economics.....	155
5.5	Some concluding comments regarding Evolutionary competition theories.....	158
	Conclusions	161
	Conclusions of Part I	172
	Part II - Competition and Market power in contemporary capitalism: an analysis of two archetypal situations.....	174
	Introduction	174
	Chapter 3: Contributions for a theory of competition and market power within and between global value chains	177
	Introduction	177
1	Global value chains: genealogy of an eclectic concept.....	180
2	De facto power as the backbone of the network-firm: an evolutionist approach to global value chains	186
3	Short-run competition and market power within and between network-firms	190
3.1	Net independence as the source of intra-network-firm market power	191
3.1.1	A theoretical approach	191
3.1.2	A graphical representation	193
3.2	The compatibility between long-term profit rate differentials and horizontal price competition 199	
4	Long-run competition for fully vertical market power	213

4.1	"Make-or-buy" and innovation decisions as long-run competition for fully vertical market power	214
4.2	Institutional change as long-run competition for fully vertical market power.....	217
	Conclusions	220
	Chapter IV: Competition and market power in platform capitalism: the case of trust-based algorithmic coordination firms.....	224
	Introduction	224
1	The rise of the trust-based-algorithmic coordination firm in the context of the platform economy: from technological to organizational revolutions.....	226
1.1	The emergence of the platform economy	226
1.2	The emergence and evolution of trust-based algorithmic coordination platforms.....	231
2	A competence-based definition of the trust-based algorithmic coordination firm	236
3	Competition and market power dynamics in for-profit trust-based algorithmic coordination firms	242
3.1.1	Competition between trust-based algorithmic coordination platforms entrants and traditional incumbents.....	243
3.1.2	Competition between trust-based algorithmic coordination platforms	251
	Conclusions	269
	Conclusions of Part II	271
	General conclusions.....	273
	Main original findings	273
	Changes in institutions, technology and the nature of the firm not only affect the degree of market power; they also transform the nature of its link with competition	273
	Market power can be based on the capacity to efficiently coordinate production... and this gives it the possibility to coordinate competition.....	275
	Limitations and future lines of research	277
	Limitations	277
	Future lines of research.....	278
	A wider empirical corroboration of our theories of competition and market power	278
	Consequences for antitrust.....	279
	A wider study of the relation between competition and market power in the platform economy	279
	References	281

Table of figures, tables, diagrams, equations and procedures

Figure 1: The Evolution of Average Markups (1960 - 2014). Average Markup is weighted by marketshare of sales in the sample	16
Figure 2: Return on invested capital excluding goodwill, U.S. publicly traded nonfinancial firms	17
Figure 3: Evolution of the U.S. consumer price index (CPI), seasonally adjusted, 1979 to 2016	18
Figure 4: Trade as percentage of GDP in the world and the United States (1870-2015).....	19
Figure 5: Patents granted by the U.S. Patent Office per Million Residents of the United States	39
Figure 6: Index of general the general price level for the United States (January 1860 to November 1939) – 1913=100	41
Figure 7: Wholesale prices in the United States for 140 years (1793 to 1932).....	41
Figure 8: The private nonresidential US economy: The profit rate (regular line) and its trend (dotted line) – (1869-1997)	42
Figure 9: Total antitrust cases (left axis) and percentage of Antitrust Division cases won (right axis) in the United States (1920-1952)	69
Figure 10: Expenditure on antitrust enforcement in the United States (1920-1952)	69
Figure 11: Percentage of intermediary products imports in global imports (1955-2011).....	87
Figure 12: Value added coming from another country as percentage of total exports of the main 62 economies of the world.....	87
Figure 2: Return on invested capital excluding goodwill, U.S. publicly traded nonfinancial firms	93
Figure 13: Return on invested capital including goodwill for U.S. publicly traded nonfinancial firms (in percentage).....	94
Figure 14: A cartography of competition theories	161
Figure 15: Sources of long-run profit rate differentials in competition theories	164
Figure 16: A network-firm with one upstream supplier.....	194
Figure 17: Two non-competing network-firms with two tiers and different numbers of upstream suppliers	196
Figure 18: The three competition forces in a network-firm context	200
Figure 19: Two competing network-firms with two tiers and identical topologies	203
Figure 20: Two competing network-firms with three tiers and different topologies	205
Figure 21: Moore's Law	227
Figure 22: New York monthly pickups –May 2015 and September 2016	263

Figure 23: Uber’s vs Lyft’s cumulated funding (in million US dollars).....	266
Table 1: Major characteristics of the three cost-plus pricing theories.....	119
Table 2: Betweenness centrality, price and value retained for firms in two competing supplying chains for Figure 17.....	196
Table 1: Betweenness centrality, price and value retained for firms in the two competing network-firms represented in Figure 19.....	202
Table 4: Betweenness centrality, prices in t0 and t1 and value retained for firms in two competing supplying chains represented in Figure 20.....	204
Diagram 1: The predatory form of competition.....	42
Diagram 2: The collusive form of competition.....	53
Diagram 3: The constricted form of competition.....	64
Diagram 4: The Fordist form of competition.....	78
Diagram 5: The finance-led form of competition.....	95
Diagram 6: Summary of our concept of short-run competition and market power within and between network-firms.....	209
Equation 1: Formula of betweenness centrality of node X.....	193
Equation 2: Formula of squared betweenness centrality of node X.....	195
Equation 3: Value retained by node X.....	195
Equation 4: Selling price of node x located in tier r in absence of horizontal competition.....	195
Equation 5: Value retained by a node x located in tier r when it has to match lower prices from competing nodes of its same tier.....	205
Procedure 1: How to calculate the selling price and the value retained corresponding to a node in presence of horizontal competition.....	206

General introduction

In 1890, Mary Elisabeth Lease pronounced the following words during a political speech for the Farmer's Alliance in Kansas:

*"Wall Street owns the country. It is no longer a government of the people, by the people, and for the people, but a government of Wall Street, by Wall Street, and for Wall Street. The great common people of this country are slaves, and monopoly is the master"*¹

In July 24th 2017, while this thesis was being written, Senator Elisabeth Warren pronounced the following words during the presentation of the Democrat's new economic agenda document entitled "A Better Deal: Cracking Down on Corporate Monopolies":

"Americans know this economy is rigged, rigged in favor of billionaires and giant corporations and rigged against everyone else. It's not hard to see how this happened. In industry after industry, a handful of corporations have seized power in this country" (CNBC, 2017)

The two speeches are separated by more than a century, yet the resemblances are striking. They both represent a reaction to a feeling that was common in turn-of-the-century America and is reemerging today: competition is dying as firms' market power becomes larger by the day.

Far from being a politically driven machination, the idea that market power is killing competition in the United States has been worrying academics, the Federal government and the general public. A few days before these lines were written, the popular American satire news show *Last Week Tonight with John Oliver* was devoted to corporate consolidation and the dwindling of competition. The same concern had reached the Federal government before it found a voice in mass media. In 2016, the Council of Economic Advisers (CEA) wrote in a document entitled "Benefits of competition and indicators of market power" that "recent indicators suggest that many industries may be becoming more concentrated, that new firm entry is declining, and that some firms are generating returns that are greatly in excess of historical standards" (CEA, 2016, p. 14). Academics are also worrying about this phenomenon. In words of the 'Nobel Prize' awarded economist Joseph Stiglitz (2012, p. 44), "some of the most important innovations in business in the last three decades have centered not on making the economy more efficient but on how better to ensure monopoly power".

¹ Quoted in Zinn (2006, p. 288)

There is a sense of *déjà-vu* in the American society regarding the link between market power and competition. As former antitrust official at the Justice Department Allen Grunes put it, “we’re back to a little bit of the new Gilded Age”². According to this view, the United States has experienced a phase of monopolization until the 1940s, when severe antitrust enforcement set a hiatus that would have ended by the mid-1970s. For the past four decades, just like by the end of the XIXth century, market power would have increased to a level that hindered competition. This thesis will be devoted to discussing this assertion and its theoretical implications for competition theory by focusing on two recent competitive dynamics: competition between and within global value chains and competition between firms of the emergent platform capitalism such as Uber and Airbnb that we will define as ‘trust-based algorithmic coordination platforms’.

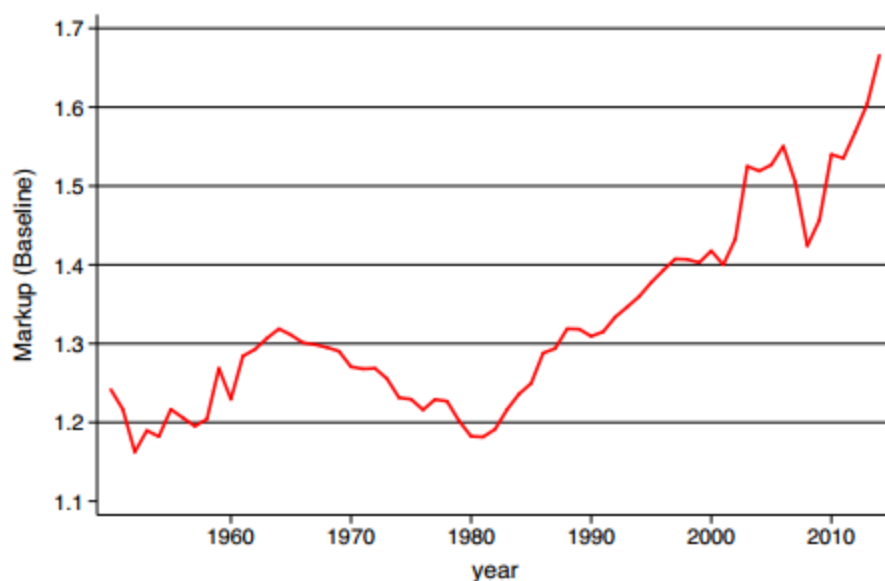
The research question at the core of this thesis emanates from the confrontation of stylized facts regarding the link between competition, market power and firms’ performances. We will present them in the following lines before formulating in detail the research question that is at the core of this thesis.

Market power rose in the United States since the 1980s: higher and more unequally distributed profits

A recent strand of literature has been showing signs of increasing market power in the United States. In a recent article, De Loecker and Eeckhout (2017) used 1950-2014 balance sheet data of American publicly traded firms to show how their markups over marginal costs rose from 18% in 1980 to 67% in 2014, as shown in Figure 1.

² Quoted by Dayen (2015).

Figure 1: The Evolution of Average Markups (1960 - 2014). Average Markup is weighted by marketshare of sales in the sample



Source: De Loecker and Eeckhout (2017, p.9)

Using an alternative measure of markup, the BLS markup (the inverse of the labor share), Nekarda and Ramey (2013) also find a historical rise starting in the 1980s and accelerating in the 2000s. Eggertson, Robbins and Wold (2018), in turn, estimate mark-ups as the inverse of the share of production not accounted for by pure profits. They find an overall increase of a similar magnitude as Nekarda and Ramey’s (from 1.1 in 1970 to around 1.2 in 2015) but different dynamics: a steady increase instead of an acceleration in the 2000s³. If we measure the share of profits in total value added by corporate business, the same historical swing in firms’ profitability can be identified, although it would have started in the 1990s, as the data from the U.S. Bureau of Economic Analysis (2017) shows. Duménil and Lévy’s (2011) measurement of the long-term evolution of the profit rate in the United States (net domestic product minus labor compensation over fixed capital net of depreciation) also shows a recovery since the 1980s, although less pronounced. Finally, using corporate post-tax profits as a share of GDP or return on capital as indicators of market power, we can also observe a historical rise starting in the 1990s, as shown by the Economist in its article entitled “Too much of a good thing” (The Economist, 2016).

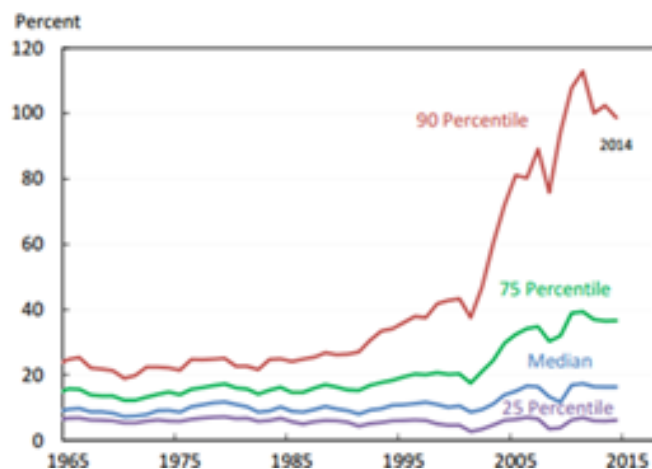
We can see that, regardless of the measurement chosen, the literature shows a historical recovery of profitability in the American economy since the 1980s/1990s, which indicates an overall larger market

³ It is worth mentioning that the authors calculate four different versions of the mark-up series, “each under different assumptions about the risk premium and the relative price of capital; these series all show a similar trend” (Eggertson, Robbins and Wold, 2018, p. 26)

power. Perhaps more interestingly, as the above-mentioned article from The Economist also shows, not only has profitability raised in the last decades, but the distribution of profits has been increasingly concentrating among fewer firms.

In this vein, De Loecker and Eeckhout (2017) also show that, since the 1980s, there has been an increasingly uneven distribution of mark-ups that can be explained to a great extent by abnormal growths in the mark-ups of 10% of the firms. Once again, using alternative indicators of profitability, the results remain very similar. Analyzing the evolution of U.S. publicly-traded nonfinancial firms' return on invested capital, Furman and Orszag (2015) also find a large gap of profitability in favor of the 90th percentile of firms starting in the mid-1980s and widening in the 2000s, as shown in Figure 2.

Figure 2: Return on invested capital excluding goodwill, U.S. publicly traded nonfinancial firms



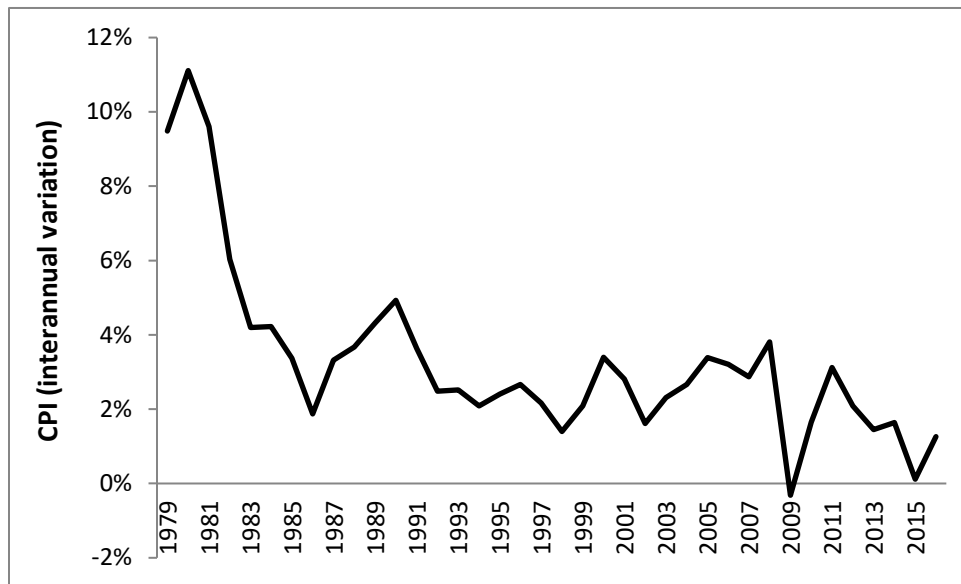
Source: Furman and Orszag (2015, p. 10)

... in a context of strong global price competition

Conventionally, competition theory would argue that a long-term increase in market power should be followed by increases in prices, which would explain the sharp increase in profitability since the 1980s/1990s in favor of a few firms we have exposed above. The standard definition of market power is precisely “the ability of a firm (or group of firms) to raise and maintain price above the level that would prevail under competition” (OECD, 1993, p.57).

Nevertheless, prices have remained stable since the 1980s, and have even shown a slight negative tendency after the 2008 crisis, as shown in Figure 3.

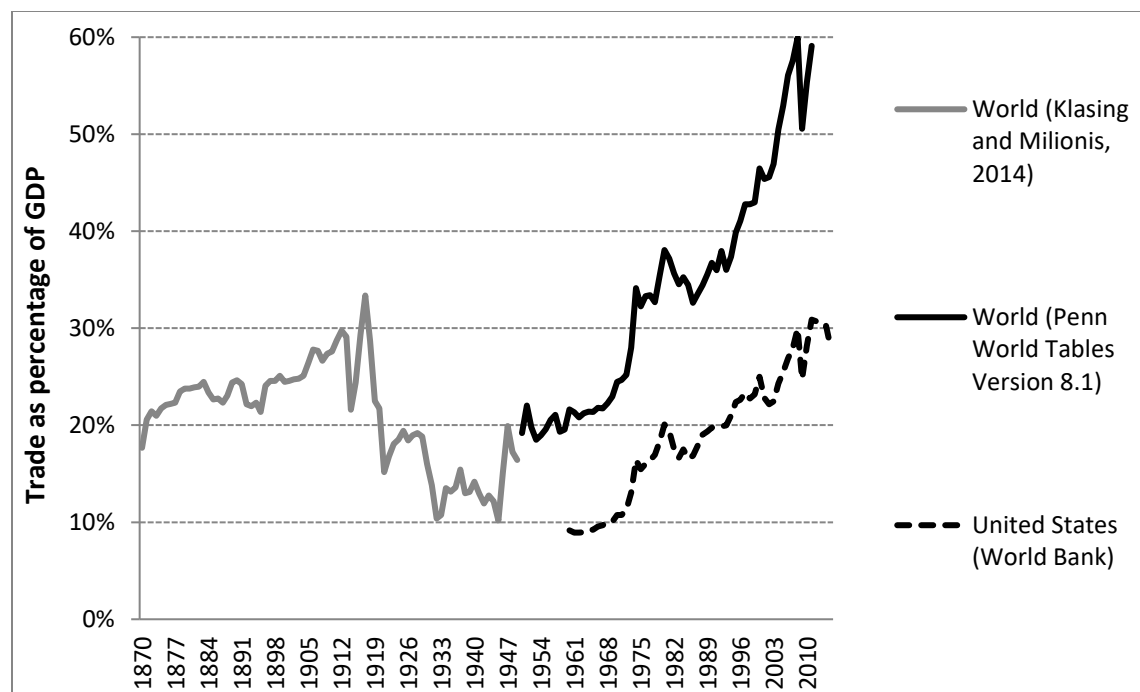
Figure 3: Evolution of the U.S. consumer price index (CPI), seasonally adjusted, 1979 to 2016



Source: own elaboration based on data from the Bureau of Labor Statistics

In this vein, using data of publicly available market shares and price indices for the 1972-2012 period, Ganapati (2017) finds that, although American industries have grown more concentrated notably through the growth of the very largest firms, the effect on prices has been negligible in the case of manufacturing industries (where output did not decrease) and inexistent in the case of non-manufacturing industries, where output has even increased. The decreasing tendency of prices has been attributed to “a combination of weaker unions, intense global competition, and occasional tightening by the Federal Reserve” (Guttmann, 2016). Regarding competition, we have to stress that exposure to international competition has never been stronger in history, as the evolution of the historical trend of trade openness in the international economy and the United States indicate (cf. Figure 4).

Figure 4: Trade as percentage of GDP in the world and the United States (1870-2015)



Source: own elaboration based on Klasing and Milionis (2014), Penn World Tables⁴ and World Bank

Since the 1980s, the world has witnessed the integration of trade and the disintegration of production (Feenstra, 1998). Technical progresses made possible the spreading of modular production to many industries. At the same time, international trade was liberalized and technological progress reduced communication and transportation costs. This allowed for a new international division of labor in which, following a modular form of production, firms spread around the globe started exporting inputs to subcontracting firms located in other countries and re-importing final products, forming what the literature latter labelled as “global value chains” or (internationally-dispersed) “network-firms”. In this context, price competition increased to historical levels and became global, and the United States have not been spared. It has become a commonplace among economists and researchers in management to speak of intensified global competition since the 1990s as a result of trade liberalization and the spread of global value chains across the globe (Gereffi, 2014).

⁴ Available at <http://cid.econ.ucdavis.edu/pwt.html>

The competition/market power blind spot in competition theory

In an article entitled “Bring Back Antitrust”, Dayen (2015) put in blunt words the trigger of this investigation: “So if monopolists are jacking up prices, why does this not show up in a higher consumer price index?”. On the one hand, there are undeniable signs of a rise of market power in the American economy since the 1980s/1990s. On the other hand, and largely as a result of profound transformations in technology, trade and the organization of production at the world scale, price competition has never been more international and fiercer. Contrary to what competition theories would argue, prices have not risen as a result of increasing and sustained market power.

There is therefore a blind spot in competition theory regarding the current link between competition and market power. How can it be possible that overall profitability and profit rate differentials among firms have been increasing for decades, yet prices remain constant and price competition global and strong? Are we witnessing another historical phase of “oscillations in the balance of the monopoly-competition dialectic” (Christophers, 2016, p. 75) in which, once again, market power is strong, or rather a historical context of exceptionally competitive global markets? Are these two states of affairs incompatible, as the traditional opposition of the concepts of competition and market power would suggest? Can we say along with Marx (2008, p. 165) that “monopoly produces competition, competition produces monopoly. The monopolists are made by competition, the competitors become monopolists”, meaning that one will always eventually eliminate or overshadow the other? In other words: can competition and market power coexist? In this thesis we will argue that they can.

Explaining how new competitive dynamics characterized by a synergic relation between competition and market power emerged as a historical process and how they can be theoretically apprehended through the lenses of competition theory is the main objective of this thesis. In order to do so, we will focus on two recent profound changes that have introduced new competitive dynamics: the rise of global value chains since the 1990s and the emergence of platform capitalism in the 2000s.

Theoretical approach and methodological choices

The main objective of our thesis, as well as our own understanding of Economics, imposes at least two wide theoretical choices. The first one refers to adopting a theoretical framework in which ‘history matters’ and institutional transformations can be traced back to understand the evolution of the link

between competition and market throughout history. Indeed, it is our belief that no light can be shed on the competition/market power blind spot without investigating the historical formation and particularities of the new forms of competition we are witnessing. The second one refers to the theory of the firm on which any competition theory relies.

Regarding the central role of institutions and history in our understanding of the transformation of the link between competition and market power, we will adopt the Regulation Theory's theoretical framework. Regulation Theory was born in France in the 1970s as an attempt to understand how capitalist accumulation regimes can vary over time and space in their logics of functioning, including their specific conditions of crisis. This diversity is rooted in the multiplicity of institutional forms that compose a specific accumulation regime. Institutional forms are the result of the institutionalization of the existing conflicts between actors in the economy and regulate its functioning. "Forms of competition" defined as "the relations between groups of fractioned accumulation centers whose decisions are *a priori* independent from each other are organized" (Boyer, 2004, p. 39) constitutes one of the five elementary institutional forms identified in Regulation Theory⁵:

Although the form of competition, as defined above, covers many types of relationships between firms and their outcomes, the research done so far within Regulation Theory has been insufficient and, in many cases, exclusively focused on pricing mechanisms (Brenner & Glick, 1991). It has been even defined by Boyer, one of the fathers of Regulation Theory, as "the process of price setting that corresponds to a standard configuration of the relations between the participants of the market" (Boyer, 2004, p. 19)⁶. For this reason, some authors, including scholars that proclaim themselves as adherents to Regulation Theory, have criticized the simplicity with which the form of competition has been treated in respect to the other four basic institutional forms (Christophers, 2016; Hollard, 2002; Peck & Tickell, 1992).

Conscious of the limitation of the concept of form of competition in its current state, and equally aware of the importance of institutions and history to understand the evolution of the link between market power

⁵ The four other ones being :

The wage-labor nexus: it refers to relations between capital and labor in terms of the organization of labor and the modalities of remuneration of capital and labor;

International relations: it refers to the relations between the nation-state and the rest of the world;

Money: as the general equivalent and the link between private decentralized producers, money constitutes a basic institution without which capitalistic accumulation regimes could not exist;

The form of the State: it refers broadly to how the state intervenes in the economy (e.g. as a producer or a technocratic regulator) (Boyer, 2004, p. 39). Translation is ours.

⁶ The translation is ours.

and competition, we will adopt a larger Regulationist framework in our historical understanding of this evolution. This will imply widening the spectrum of issues and relations examined beyond pricing. In Chapter I we will study how the ever-changing interplay between certain institutions, technology and the transformation of the firm has affected rivalrous relations between firms, resulting in stable forms of competition over time. In particular, we will pay attention to antitrust enforcement and jurisprudence, the organization of research and development (R&D) and the intellectual property regime, the role of the financial sector, the impact of technology and the organizational aspects of the firm. For each form of competition analyzed, our focus will be the link between competition and market power, which will inevitably highlight some aspects of competitive relations between firms and downplay others.

The second theoretical framework on which the thesis will be developed is the evolutionary theory of the firm. Because competition theory describes the laws of interaction between rival firms, it necessarily refers to an underlying theory of the firm. Evolutionary theory has a resource-based approach of the firm (Coriat & Weinstein, 2010). It conceives the firm as a unique repertoire of routines (Nelson & Winter, 2004), the latter being problem-solving devices (Coriat & Dosi, 2009) the firm possess and allows it to coordinate and treat knowledge. Routines can evolve, but they do it following path dependency: “a firm’s previous investments and its repertoire of routines (its ‘history’) constrains its future behavior” (Teece, Rumelt, Dosi, & Winter, 1994, p. 17). In Part II we will develop our own contribution to competition theory in the contexts of global value chains and trust-based algorithmic coordination (TBAC) firms. In both cases, we will consider firms’ behavior as strategic choices based on their respective repertoire of routines in the context of historically institutionalized relations that affect them. In that sense, both the Regulationist and the Evolutionary approaches will blend in to set the theoretical basis of our investigation.

In addition to the choice of a theoretical framework on which to develop our investigation, we have made some methodological choices that shaped it and are worth mentioning. Firstly, this thesis is mainly a theoretical contribution. This does not imply that empirical elements are excluded, as this introduction has already shown. Nevertheless, no original empirical contribution is offered besides some stylized facts. We will mainly recur to different sorts of stylized facts or econometrical work done by colleagues to describe the phenomena our theoretical contributions will try to account for. Fortunately, in the process of our investigation, we have found most of the necessary empirical work to be available, which allowed us to focus on our theoretical developments aimed at making sense of these empirical results. Moreover, mathematical modelling was not required. Although the theoretical contribution presented in Chapter III can be modeled (and, as the reader will see, builds on basic mathematical concepts from network theory),

we did not consider that doing so would make our contribution any clearer or would provide new relevant results.

Secondly, our investigation does not focus on any particular industry but has rather the intention of maintaining a level of generality that allows it to be used to analyze different industries. This creates of course obstacles and presents some advantages. On the one hand, it implies a level of abstraction that obliges us to ignore some industry-specific competitive dynamics. On the other hand, it allows us to see through industry specificities to find common patterns of competitive relations and market-power-exertion mechanisms. Moreover, the two objects chosen to focus on, global value chains and TBAC firms (the latter usually referred to as ‘sharing economy’ or ‘platform-firms’), have been studied in the literature as such (including in respect to competitive relations) although they are not industry-defined. In sum, it can be said that this thesis studies cross-industry *organizational* objects and their relations.

Finally, although the analyses of recent forms of competition on which our competition-theory-related contributions will be based are not country-specific but organizational-object-specific (global value chains and TBAC firms), our long-term of analysis of the transformation of the link between competition and market power is necessarily centered on a country. The above-quoted institutions that will be examined to understand successive historical configurations of forms of competition present country specificities that become more accentuated as we go back in time. Therefore, when studying the evolution of forms of competition in Chapter I, we had to make a choice regarding the country of analysis. As the first lines of this introduction hinted, the country chosen is the United States. This responds to two criteria. First, it is the country in which more forms of competition can be traced back. As we will show along Chapter I, this is due to a great extent to its early antitrust law and the different ways in which it has been applied over time according to evolving jurisprudences, the latter being possible because of the common law tradition of the country. Second, this long and winding antitrust history has resulted in the “constitution of a reservoir of experiences which have been a source of inspiration for the Community and later on for the European Union” (Encaoua & Guesnerie, 2006, p. 19)⁷. But the influence of the historical experience of the United States in terms of forms of competition does not stop at antitrust. As it will be seen by the end Chapter I, the United States has been one of the major engines of the institution of the current hegemonic form of competition, which has taken a global scale. Antitrust legislation is just one piece of it. Then, in order to understand the current hegemonic form of competition, studying the history of the United States’ forms of competition becomes crucial.

⁷ The translation is ours.

Structure of the thesis

The thesis is structured in two parts, each consisting of two chapters. The two-part structure follows from the way in which each chapter approaches the common thread of this thesis: the link between competition and market power. While Part I examines it by looking into the past (American economic history) and the concepts that have been produced to account for it (competition theories), Part II focuses on how this link operates in two archetypical organizational objects of contemporary capitalism: global value chains and digital platforms.

The first part, entitled “Competition and market power: lessons from theories and history” is devoted to investigating the link between competition and market power in American economic history and in the existing competition theories. The goal of the first part is to understand the different ways in which competition and market power can interact and, in that manner, to find elements that can help us explaining how market-power-driven long-run profit rate differentials can coexist with strong price competition today. In order to do so, we examine, in the first place, the rich American economic history and identify a variety of relations between competition and market power throughout history. In the second place, we review the different competition theories that, very much inspired by American economic history, have produced concepts to explain these relations.

Chapter I investigates the evolution of capitalistic forms of competition in the United States from the 1840s to today with a focus on the link between competition and market power. By analyzing how the interactions between certain institutions (antitrust enforcement and jurisprudence, the organization of Research & Development, the intellectual property regime and the role of the financial sector), the impact of technology and the organizational aspects of the firm have forged successive forms of competition, we identify different relations between competition and market power over time. We show that while in some cases competition has effectively meant the lack of market power or, inversely, market power took over competition, in others it has served to (imperfectly) regulate it, while in the current dominant form of competition (‘Finance-led’, circa 1980s to today) market power *articulates* competition, establishing so a symbiotic relation with it.

Chapter II reviews all the existing competition theories with a focus on how they conceptualize the link between competition and market power, examining the mechanisms through which they back or reject the proposition according to which competition eventually leads to market power creation and exertion (the “market power paradox”). We find that, regardless of their stands on this proposition, they all consider competition and market power as two opposed concepts that exclude each other. We show that, because

of that reason, none of them can account for the coexistence of two major stylized facts proper to the current hegemonic form of competition mentioned in Chapter I and in this introduction: long-term profit rate differentials between firms and strong price competition.

Part I shows that competition and market power have established symbiotic relations in the past but that, nevertheless, competition theories have failed to account for this symbiosis, and therefore to produce concepts that can contribute to explaining the coexistence between the two above-mentioned stylized facts. In order to offer contributions to such an explanation, we proceed with **the second part of the thesis, entitled “Competition and market power in contemporary capitalism: an analysis of two archetypical situations”**. Part II is dedicated to exploring and analyzing the relation between competition and market power in two organizational objects, each of them corresponding to novel and important evolutions of contemporary capitalism: global value chains and for-profit digital platforms. The fact that the two are proper to contemporary capitalism and, more precisely, to the current Finance-led form of competition identified in Chapter I, makes them ideal research objects to account for the coexistence of the two above-mentioned stylized facts. In this vein, we show that despite the evident differences between global value chains and for-profit digital platforms, they both share organizational logics and apply similar mechanisms through which, in contemporary capitalism, competition can be articulated by market power, resulting in strong price competition and long-run profit rate differentials coexisting across industries.

Chapter III develops a contribution to the theory of competition between and within global value chains (internationally dispersed network-firms) that can coherently account for the two above-mentioned stylized facts. The theory parts from a context of vertical disintegration in which firms are forced to form network-firms to be able to gather the collective competences required to produce a final product and compete with other network-firms. This creates uneven interdependence between them, since some possess competences that are more crucial to survive network-firm vs network-firm competition. We show that uneven interdependence is the source of within-network-firm market power, which can explain long-term profit rate differentials between firms of the same network-firm. Then we show how these profit rate differentials can be compatible with strong competition on prices between network-firms.

Chapter IV studies competition and market power dynamics in platform capitalism by focusing on ‘trust-based algorithmic coordination’ (TBAC) firms. After explaining the emergence of the platform economy in the 2000s, we build on the evolutionary theory of the firm to characterize an emerging type of firm within the platform economy, the ‘trust-based algorithmic coordination’ firm. Based on our findings on the relevance of algorithmic coordination in this type of firm, and taking into account some properties of

multisided markets in play, we claim that there is a winner-takes-all competitive dynamic in TBAC firms. Using the case of the ride-hailing company Uber to illustrate, we show that, just as in the network-firm, the TBAC firm conjugates vertical market power (TBAC firms being able to obtain increasingly higher shares of the value created with other members of the network, e.g. drivers) with strong price competition (e.g. Uber constantly cutting prices to leave its competitors out of the market) in a competitive dynamic in which there is a tendency towards monopolization.

To close our investigation, a conclusion presenting our main findings as well as some of the limitations of our work and future lines of research is presented.

Part I - Competition and market power: lessons from theories and history

Introduction

In **Part I** we will take a first step towards the comprehension of how can long-run profit rate differentials between firms, a sign of prolonged market power, can be compatible with strong price competition. The coexistence of these two stylized facts suggests a relation between competition and market power different from the traditional antithetical one according to which the presence of the latter hinders the former. Consequently, we will examine the link between market power and competition in American history (Chapter I) and in competition theories (Chapter II) in search for elements that will allow us to conceptualize a different relation between these two concepts.

Taking a Regulationist approach, **Chapter I** will identify a series of forms of competition in the United States from the 1840s to today. For each form of competition, we will focus on the link between market power and competition throughout time, as the evolving hierarchical combinations between technology, organizational aspects of the firm and some major institutions (antitrust, research and development, the intellectual property regime and the financial sector) have shaped the way in which competition and market power function. In this sense, Chapter I represents a critical historical review that will offer some insights to understand the current puzzling link between competition and market power.

Chapter II will review the existing competition theories with a focus on the link between competition and market power. We will show, for each of them, how they conceive the competitive process and market power mechanisms and, consequently, under which conditions and in what range(s) of the industrial organization landscape (horizontally, fully vertically and semi-vertically) they can account for long-run profit rate differentials between firms as a result of the competitive process.

The two chapters constitute a unity in that they represent a repertoire of elements that will help us understanding the seemingly inconsistent coexistence of the two above-mentioned stylized facts. While in Chapter I we build a series of ideal types of forms of competition that try to capture heterogeneous and evolving relations between competition and market power, Chapter II is a critical repertoire of the way in which the existing competition theories have conceived that link in the past by observing economic history, and especially the rich American one.

Chapter I: A short history of capitalistic forms of competition in the United States

Introduction

The goal of this chapter is to analyze the evolution of capitalistic forms of competition in the United States. In doing so, we hope to contribute to the development of Regulation School's concept of form of competition.

The chapter will be centered on the United States, although the international dimension will not be ignored. This choice responds to two criteria: practicability and theoretical relevance. Forms of competition are not homogeneous across borders or over time, as the cross-reading of country-studies of forms of competition as different as France's (Bénassy, Boyer, & Gelpi, 1979) and the United States' (Aglietta, 1997) show. A history of capitalistic forms of competition is necessarily a series of *histories*, which would be an immeasurable objective for the scope of this thesis. A circumscription to a country is therefore needed. In that vein, the United States appear to us as the most theoretically relevant choice for two reasons. First, it is the country for which more forms of competition can be traced back. This is due to a great extent to its early antitrust law and the different ways in which it has been applied over time according to evolving jurisprudences, the latter being partly a consequence of the common law tradition of the country. Second, this long and winding antitrust history has resulted in the "constitution of a reservoir of experiences which have been a source of inspiration for the Community and later on for the European Union" (Encaoua & Guesnerie, 2006, p. 19)⁸. However, the influence of the historical experience of the United States in terms of forms of competition does not stop at antitrust. As this chapter will show, the United States has been one of the major engines of the institution of the current hegemonic form of competition, which has taken a global scale. Antitrust legislation is just one piece of it. Then, in order to understand the current hegemonic form of competition, studying the history of the United States' forms of competition becomes a necessity.

Our reading will consist of analyzing, for each period, how, in certain historical and technological contexts, the transformation of the firm and some key institutions create institutional complementarities that shape a form of competition. In Boyer's words, we can define institutional complementarity as "a configuration in which the viability of an institutional form is strongly or entirely conditioned by the

⁸ The translation is ours.

existence of several other institutional forms, such as their conjunction offers greater resilience and better performance compared with alternative configurations” (Boyer, 2005). Amable and Petit (1999) identify three ways in which institutions can create complementarity:

1. Institutions that have a common activity
2. Institutions that have a joint effect on something
3. Institutions that share the same “rules syntax”

The first way refers to institutions that collaborate in a process (for example, a research lab and pharmaceutical firms that develop a molecule together) as well as to an institution that regulates another. The second way of institutional complementarity refers to situations in which the simultaneous presence of two or more institutions has a joint effect on something else without a necessary direct interaction between the institutions. For example, the coexistence of a market-led financial system and a flexible labor market can have the joint effect of enhancing innovation in dynamic high-tech sectors that require short-term investments. The third way of institutional complementarity refers to institutions that share the same structure of “rules syntax” (Amable & Petit, 1999). This implies that agents from those institutions can understand them more easily, which has a positive effect on the outcomes that depend on those agents.

Moreover, the dynamics and coherence of institutional architectures rely on a hierarchy of institutions. The notion of hierarchy of institutions can be interpreted in both static and dynamic terms. In static terms, it refers to the fact that “the inner design of one institution takes into account the constraints and incentives associated to another one” (Amable, 2000). In other words, the dominant institution(s) impose(s) the conditions that complementary institutions will complement within the boundaries of the institutional architecture. In dynamic terms, institutional hierarchy means that “the transformation of one institution affects the evolution of another one” (Amable, 2000).

Along this chapter we will identify a series of forms of competition that should be read as a series of institutional architectures. We will show the institutional complementarities and hierarchies that characterize each them. Regarding the institutions that will be analyzed, we will pay attention to antitrust enforcement and jurisprudence, the organization of research and development (R&D) and the intellectual property regime, the role of the financial sector, the impact of technology and the organizational aspects of the firm. As the concept of institutional hierarchy indicates, depending on the period under analysis, some might be more relevant than others. Each section of the chapter will develop on a form of competition and provide at the end a diagram that signals which institution is dominant and identify the

institutional complementarities that are built around it to constitute the form of competition under analysis.

We will follow a chronological order in which each section of the chapter will be devoted to a certain time period for which we identify a particular form of competition. This, besides the evident clarity it brings in respect to a non-chronological analysis, has the advantage of showing the historical rationale of the evolution of forms of competition. In other words, we will try to show how the problems caused by each form of competition opened possibilities for the birth of a new one that would try to solve them and, in doing so, redefine them. Far from being a historical analysis, this chapter is to be understood as an attempt to identify throughout the capitalistic economic history of the United States certain issues related to the tensions and complementarities between market power and competition to which the next chapters will be devoted.

The periodization that we will develop in this chapter is not to be interpreted as a univocal way of understanding forms of competition. Instead, the forms of competition we will propose are to be read as a series of ideal types that can be identified in certain periods of American economic history. Depending on the scope of the concept of form of competition employed, as well as the special interest given to some aspects, several ideal types are possible. Our focus lies in the historically determined link between competition and market power, and our periodization is necessarily influenced by this approach. Moreover, different forms of competition can coexist; the ideal type we will present for each period is therefore not present across all industries and is certainly not the only one acting in the period in question. Moreover, period cuts can never express a perfectly synchronized evolution of all the institutions and the firm that result in a new form of competition. Therefore, our historical characterization can surely be discussed. Our purpose is merely to be able to offer a stylized variety of historical forms of competition in that brings out the ever-changing relations between market power and competition and the concrete forms they take.

In that vein, we will show along this chapter that, once the emergence of a national capitalistic market dissolved local monopolies around the 1840s, the competitive landscape that resulted was unregulated in the broadest sense of the term, and firms had little market power, which led them to a ruinous dynamic during what we have labeled the ‘predatory competition’ phase (1840s to 1860s). Between the 1870s and the 1910s, an era we have termed ‘collusive competition’, competing firms colluded to *coordinate* competition, not to annul it. However, in face of the weak enforceability of pools, the emergent federal antitrust attack on trusts, and the lack of barriers to entry, firms failed in using horizontal market power to coordinate competition. As a result, a profitability crisis opened the way to the ‘constricted competition’

era (1920s to 1945). During that period, firms accumulated market power through vertical integration and the anti-competitive use of intellectual property. This new form of market power, which benefited now from barriers to entry, allowed them to restore profitability by *constricting* competition. The profound step-up of antitrust that took place since the 1940s put an end to that regime and paved the way for the 'Fordist competition' era (1945 to 1970s), in which market power was rigorously limited by antitrust authorities. Consequently, competition (this time regulated by the state) flourished again. Given that this form of competition depended on continuous productivity increases that at some point could not be met in face of increasing foreign competition and salary hikes, a new profitability crisis took place in the late 1970s. Again, a new form of competition would emerge from it, the 'Finance-led' one (1980s to present). In this form of competition, the liberalization of finance allowed shareholders to demand high returns on investment, a demand that has been met in part by restructuring the balance between competition and market power. The firm disintegrated vertically and the landscape of industrial organization turned into one dominated by international competing networks of firms (global value chains), each coordinated by some lead firms possessing key competences which are protected by a strengthened and internationally harmonious intellectual property regime. In this new form of competition, fierce international competition *between* global value chains coexists with vertical market power *within* each value chain, the latter playing the role of *coordinating* the production and competitive processes.

1 Predatory competition (circa 1840s to 1860s)

“Easy and tolerant competition is the antithesis of monopoly; the cut-throat process is the father of it”

John B. Clark (1887), *The Limits of Competition*

During the second half of the XIXth century, the United States underwent a radical transformation of its economic system that, although multifaceted, can be read through the lenses of one major revolution: the consolidation of the corporation as the organization carrying on the production and the delivery of goods and services and, later on, innovation. As we will show along this section, the growth of the corporation, in harmony with other institutional and technological transformations, gave birth to the first capitalistic form of competition the country has experienced: predatory competition. In this section, we will describe these transformations in order to show how the institutional complementarities they present forged a particular form of competition in the mid-nineteenth-century. The latter was characterized by an unstable competitive process in which evenly matched firms engaged in cutthroat price competition and predatory competitive practices that led to recurrent profitability and overproduction crises.

Before the 1840s the legal entity used by most firms was the partnership, which “remained the most common and dominant form of capitalist organization down to the nineteenth century” (Banaji, 2007). Partnerships consisted of two or three associates that were usually relatives and based their accounting systems in double-entry bookkeeping (Chandler, 2002). Given the vastness of the American territory and the lack of reliable transportation and communication networks, merchants created merchant networks that, by linking together partnerships, assured the flow of goods up to local markets. Partners and itinerant peddlers would purchase goods from some parts of the country and sell them in other ones, assuring in that manner the market the coordination process of delivering goods across the country and earning markups over the purchase price. Merchants and local firms benefited from a geographical monopoly (Fligstein, 1993). Manufacturing, in turn, was mostly handcrafted and mass production was rare. Individual producers made independent decisions on price, production levels, and quality (Fligstein, 1993). Until the aftermath of the Civil War in 1865, slavery was the dominant social form of organization of mass production in the farming sector. There were not production markets in the sense of a “self-reproducing social structure among specific cliques of firms and other actors who evolve roles from observations of each other’s behavior” (White, 1981, p. 581). **Because production did not rest on free labor and producers and sellers were not linked to each other by interdependences based on**

economic rivalry beyond the scope of very limited local markets, we cannot speak of capitalistic competition in the United States before the 1840s.

Around the 1840s, two sets of innovations, one organizational and the other one technological, disrupted the American economy and paved the way for the configuration of its first capitalistic mode of competition. On the technological side, the apparition and the expansion of the railway and the telegraph are certainly the most relevant ones. Although the steamboat had already triggered a revolution in transportation by allowing fast transportation of large amounts of goods in the late XVIIIth century, the railroad amplified it in intensity and scope and brought about a significant qualitative transformation that would have profound economic effects and transform competition. The railroad reduced dramatically transportation costs and allowed to transport large amounts of goods over long distances faster and with fewer costs than the steamboat (Lamoreaux, Raff, & Temin, 2002). Moreover, just as the steamboat, which had cut dependency over wind to transport merchandises through rivers, the steam locomotive made all-weather transportation possible. On the qualitative side, the railroad allowed something that the steamboat did not: (almost) total independence from geography. Railroads could be deployed practically anywhere to link regions of the country without having to follow the natural course of rivers. This, coupled with the replacement of traditional sources of energy (men, animals and wind power) by fossil fuels that the availability of coal at industrial levels had allowed for by the mid-1830s (Chandler, 2002), rendered capital independent of geography both in terms of energy sources and transportation possibilities. As a consequence, industries counting on coal-fueled machinery could locate next to the cities that concentrated the labor force instead of locating next to rivers that were far from highly-populated cities (Malm, 2016), which allowed for the consolidation of a labor market and gave a push to industrial manufacturing. Finally, the telegraph, which by the 1840s had been considerably deployed in the most relevant parts of the country (Lubrano, 2013), made it possible for words to travel faster than goods and, therefore, for the coordination of transportation and production across long distances to take place at a rhythm compatible with that of the flow of goods. The technological pre-condition for a national market were met. This transformed competition profoundly because the deployment of these technologies “eroded geographical monopolies to create a single national market” (Kunzlik, 2003). In other words, small-scale geographical monopolies were substituted by nationwide competition. This process was accelerated at the pace of the expansion of railways, which peaked at the end of the XIXth century. While in 1870 there were 50.000 miles of railways in the United States, by 1900 this number was quadrupled to 200.000 miles (Kunzlik, 2003).

The identity of competitors changed dramatically as well. To explain this transformation we need to take into account how the above-described technological transformation interacted with the other major

(organizational) innovation that took place in the 1840s: the growth of the corporation. Although the United States had inherited the legal figure of the corporation from English jurisprudence in the XVIIIth century, corporations were heavily regulated. Of all regulations, the most significant ones were related to the rigidity of the granting of corporate entity that states (and not the Federal government – we will come back to this point later-) controlled. Corporate entity implies being able to maintain business in the name of the company independently of the individuals that compose it, which in turn implies limited liability. The company, and not its stockholders, is responsible for debts. Stockholders are only responsible for the capital they brought to the company. This, coupled with the fact that corporate status allowed dispersed ownership in the form of stocks (which fosters larger agglomerations of capital for business purposes) represents a clear advantage of the corporation status over other legal entities designed to do business. Nevertheless, the corporation being an exceptional legal entity at the time, it was not until the 1840s that the corporation status would start its path towards being rife. Until that time, corporate entity was exceptionally used to motivate high-risk investments or the development of projects that required large amounts of capital and slow returns such as public utilities. The corporation entity was mainly granted to enterprises in the interest of the states. The most common sectors in which firms obtained the corporation status were banking, insurance and transportation. Manufacturing was rarely undertaken by corporations (Fligstein, 1993).

In 1837 incorporations stopped being subject to state legislatures' approvals and the corporation entity started being granted under simple declaration. That year marked the beginning of the ascent of the corporation. During the same period, a series of other transformations in law eased the rigid control over management's leeway within the corporation. For example, before the 1840s every fundamental change carried on within a corporation had to be unanimous among its shareholders (Roy, 1999). By the 1840s, corporations started being allowed to hold property outside of the state in which they had been chartered, limited liability was instituted, corporations were allowed to sue or be sued in other states and contracts passed across state lines became legal (Dodd, 1955). This progressive legal easing of the corporation status not only fostered its adoption in industries that had not been benefiting from it, but also encouraged its use in businesses that implied interstate trade, which contributed significantly to the creation of a national market. By 1860, the corporate charter had been transformed from a privilege granted to enterprises serving the interest of the state to a general incorporation legal procedure available to almost all kinds of firms (Hurst, 2004).

With the dissemination of the corporation came the consequential separation of ownership and control. While partners were both owners of the capital of the partnership as well as managers of the everyday activities it implied, corporations were increasingly dissociating these two functions. **Therefore, the**

dissemination of the corporation unlocked the possibility of creating large organizational structures in charge of managing the production and distribution of goods. The railroad, the availability of coal at industrial levels and the telegraph gave corporations the technological means to do so across large distances with large groups of people disseminated in a single national market in which firms would compete.

In the United States, a young and vast country governed by a multiplicity of federated states, the corporation proved to be an efficient organization in developing transportation and communication⁹. This contrasts with other countries such as France, where a centralized federal state, which counted with efficient organizations such as the Army and the state bureaucracy that took over that task. It was precisely because the corporation proved to be efficient in developing these infrastructures with the support of the states that the latter leaned on the former to connect the country. In doing so, the corporation created a national market and, therefore, the conditions for a form of competition to emerge in the first place. Its efficiency, which would become its first competitive weapon, lied in administrative coordination.

As Alfred Chandler has shown in his seminal *The Visible Hand*, the separation of ownership and control gave rise to administrative coordination, a source of efficiency that would quickly explain the replacement of small-scale partnerships by corporations with “a large number of full-time managers to coordinate, control, and evaluate the activities of widely scattered operating units” (Chandler, 2002, p.79). The possibility of decoupling management from control gave room to a series of organizational innovations in the management of corporations that offered those who adopted them a competitive advantage. Among these innovations born in the 1850s and 1860s we can highlight the organization of the firm in divisions each in charge of a different type of operation (marketing, production, accounting, etc.), new accounting practices besides double entry bookkeeping (namely financial, capital and cost accounting) and the elaboration of internal statistics and periodical reports to implement management control. The efficient internalization of tasks that were previously carried on by separate firms coordinated by market mechanisms responds to several factors. Administered coordination implies the routinization of tasks, which, by setting repetitive standard procedures, creates automatic responses to situations instead of deliberation or contracts, which entail heavier coordination (Coriat & Weinstein, 2010) and informational costs (Chandler, 2002). Moreover, routines allow for the development of collective skills and learning (Weinstein, 2010). In the particular context of the mid-nineteenth-century United States, routines-intensive corporations were the perfect organizational match needed to exploit

⁹ Mainly the telegraph, as the other national communication network, the postal service, had been being managed by the federal and local states since the creation of the United States Post Office Department in 1792.

transportation networks and large-scale production in the most efficient way because they permitted economies of speed. In Chandler's words, at that time "slow speed of movement remained the most powerful constraint on the growth of business enterprise and on the coming of institutional change in commerce" (Chandler, 2002, p.49). Railroads and coal offered the technological possibility to increase the speed of transactions, while corporations and their administrative coordination made it possible to internalize "a high volume of market transactions within a single large modern enterprise". This "reduced unit costs of distributing goods by making it possible for a single set of workers using a single set of facilities to handle a much greater number of transactions within a specific period than the same number of workers could if they had been scattered in many separate facilities". In addition, "high-volume stock-turn assured a steady cash flow that permitted the enterprises to purchase larger quantities in cash and so greatly reduce the cost of credit needs and finance distribution of goods" (Chandler, 2002, p.232). As the case of the management of railroads exemplifies, "technology made possible fast, all-weather transportation; but safe, regular, reliable movements of goods and passengers, as well as the continuing maintenance and repair of locomotives, rolling stock, and track, roadbed, stations, roundhouses, and other equipment, required the creation of a sizable administrative organization" (Chandler, 2002,).

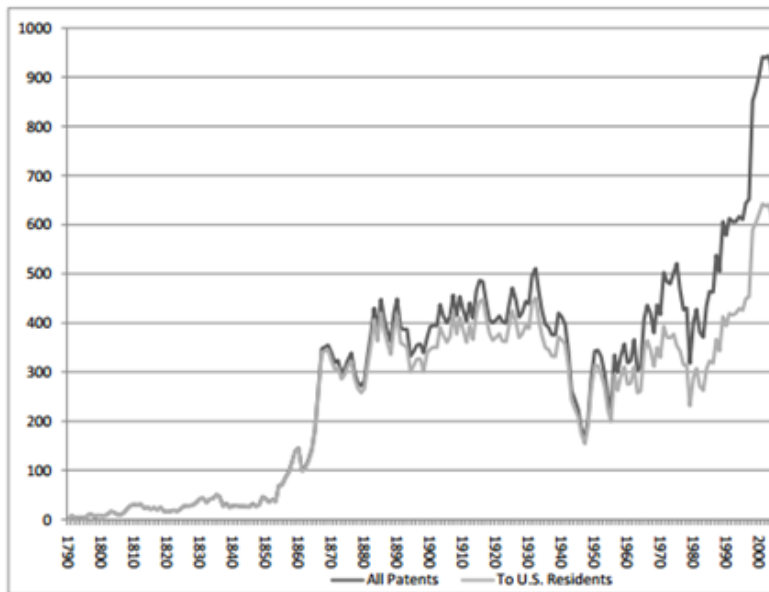
As a consequence of this "managerial revolution", the competitive landscaped was profoundly transformed. In retail, the myriad of small geographically defined monopolies held by merchants connected through merchant networks and coordinated by market mechanisms was replaced by a unified national market in which large-scale wholesalers and retailers coordinated by the visible hand of management competed on price by lowering costs through the efficiency gains that administrative coordination and its consequent speed economies allowed for. In Berle and Means' words, "the nature of capital has changed. To an increasing extent it is composed not of tangible goods, but of organizations built in the past and available to function in the future. Even the value of tangible goods tends to become increasingly dependent upon their organized relationship to other tangible goods composing the property of one of these great units" (Berle & Means, 1991, p.45) .

At the production level, transformations carried on by the corporation equivalent to that of the managerial revolution would have to wait a few more decades to take place through the organizational innovation that Taylorism represented, as we will explain in the next section. It is important to point out that, if slow speed of movement was according to Chandler the largest obstacle to the growth of business enterprise, economies of speed based on high stock-turn require mass production. The main obstacle to mass production, professions (i.e. the fact that workers could control the pace of production through their monopoly of the knowledge of the production process) had only been partially bypassed with the putting-out system, a system in which workers are in charge of recruiting other workers and of organizing and

surveilling the labor process (Coriat, 1979). After the Civil War (the first truly industrial war of the country), small merchant production that relied on the putting-out system was replaced by industrial production organized by corporations (Aglietta, 1976) that, not having still carried on a major productivity-enhancing organizational innovation equivalent to that of the management revolution, relied on increasing amounts of labor power that the first immigration wave (1815-1865) provided (Coriat, 1979), as well as on the increasing availability of land and resources that the expansion to the west of the country allowed for.

Another of the major transformations surrounding the ascent of the corporation that shaped the competitive landscape of the second half of the XVIIIth century in the United States. was the development of a patents market. In 1836 the Patent Act was passed. This law created the Patent Office and stipulated the principle of public disclosure of patented inventions. One of the most salient features of the patent regime of the period is that only individuals could hold patents. Firms had no automatic rights over the patents their employees registered, even if the invention had been developed inside the firm “in the absence of express agreement” (Coriat & Weinstein, 2011). If an employee allowed the employer to use his/her patent, he/she was implicitly granting the employer a license. This legislation led to a development of a technology market in which lawyers and patent agents played the role of intermediaries in arm’s-length transactions between individual inventors and corporations hungry to acquire any technology that could boost their productivity and help them conquer the expanding markets sooner than other competing corporations. As a result, the number of patents granted per capita exploded between the 1850s and the 1880s, as Figure 5 shows.

Figure 5: Patents granted by the U.S. Patent Office per Million Residents of the United States



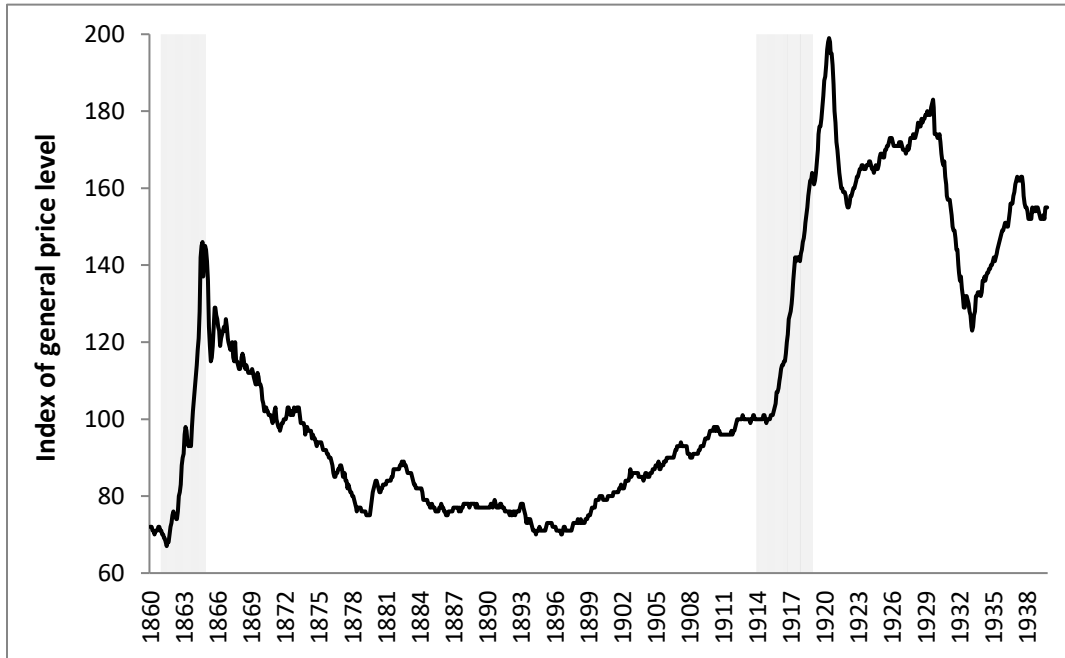
Source: Lamoreaux (2010)

Along with the above-mentioned transformations, the complementary development of a financial sector that facilitated the rise of the corporation took place. The vulgarization of limited liability with which corporate entity came along opened the door to the growth of investment markets, and the high fixed costs that most of the industries that were booming during the second half of the XIXth century in the United States (railways, mining, etc.) required large amounts of funds. The latter were provided by investment banks such as Morgan or Rothschild, which “acted as brokers when facilitating trade in existing issues and as dealers when underwriting new issues” (Festré & Nasica, 2009). Securities markets, a financial instrument that was only possible to a large scale once corporations were put at the center of production and exchange, was the mean through which investment banks financed the expansion of corporations that needed capital mainly to purchase factories and equipment (Schumpeter, 1939). It is for this reason that Minsky (1990, 1992) labels the 1813-1890 period as “industrial capitalism”. The financial sector provided the capital needed for these new large-scale corporations to expand their production capacity through the vast American territory of which railroad companies are an exemplary illustration. Indeed, they were “the leading pre-war form of big business, railroads occupied center stage in the transformation of the American economy. Investments in the railway industry were huge: they surpassed aggregate investment in manufacturing for every decade between 1850 and 1890, while the book value of railroad capital exceeded aggregate capital for the entire industrial sector until the early 20th century” (Giocoli, 2015, p. 12).

Having briefly presented some of the main transformations of the American economy between the 1840s and the 1870s, we can now start to paint a picture of the features of the form of competition that characterized that period. The main agents of competition were corporations, which were divided between industrial corporations and wholesalers; both of them were large scaled and coordinated internally by the visible hand of management. These firms were financed by investment banks that bought equity from capital-intensive industrial corporations to finance the acquisition of factories and equipment required to expand geographically and provided commercial credit for retailers and wholesalers. The centers of profit creation and appropriation were the corporations themselves, which were mostly restricted to an industry. Competition took place also at the industry level between these corporations, and the main mechanisms that firms used to outcompete their rivals were organizational innovations in the management of corporations that allowed for stronger economies of speed in a context of increasingly mass production (and, therefore, to reduce costs) and the purchase of technology from individuals in the technology markets in the form of patents. The deploying of these competitive weapons resulted in price cuts that would increase their market shares. Pricing was therefore ex-post, since firms regularly adjusted prices based on competitors' prices and fluctuations in demand and made efforts to improve their productivity in order to cut costs and survive price competition. Given that "the state and federal governments were mainly reactive and did little to stabilize competitive relations" firms resorted to competitive practices that were predatory beyond the intensity of the price warfare they practiced: they "undertook to deny direct access to raw materials, essential technologies, and customers; secretly purchased their competitors' stock; and, in the extreme, engaged in illegal disruption of production and sales" (Fligstein, 1993).

This form of competition in a nascent corporate environment characterized by capital-intensive industries with high fixed costs (Lamoreaux, 1988) resulted in a corporate landscape pullulated by "many mass-production industries in which no firm managed to outdo its competitors- industries that were populated by relatively small numbers of evenly matched firms, each of which could affect the pricing and production decisions of its rivals" (Lamoreaux, 1988, p. 16). This predatory competition dynamic led to a deflationary spiral that jeopardized the stability of firms. As Figure 6 shows, between 1865 (the year after the end of the Civil War) and 1897, the general price level experienced a sharp decrease (-51%).

Figure 6: Index of general the general price level for the United States (January 1860 to November 1939) – 1913=100

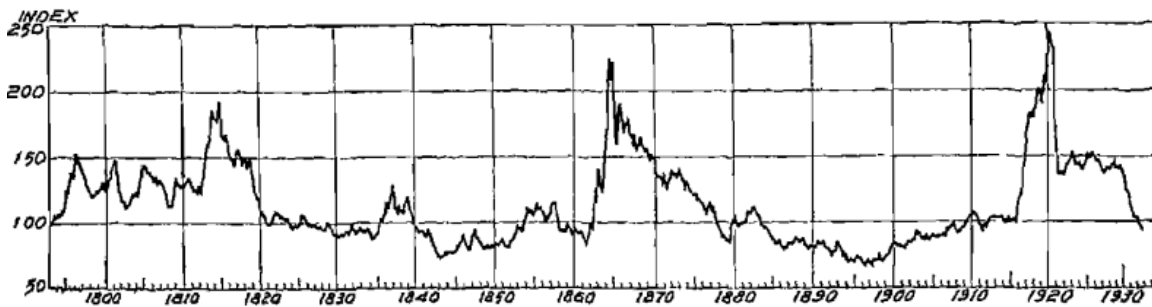


Source: own elaboration based on National Bureau of Economic Research, Index of the General Price Level for United States¹⁰

NB: Shaded years correspond to the Civil War and the First World War; values correspond to those of January for each year.

Although this deflationary process corresponds in part to a rebound in prices that followed the inflation of the Civil War, it is important to bear in mind that prices declined to a pre-war level (Warren, Pearson, & Stoker, 1932), as Figure 7 illustrates.

Figure 7: Wholesale prices in the United States for 140 years (1793 to 1932)

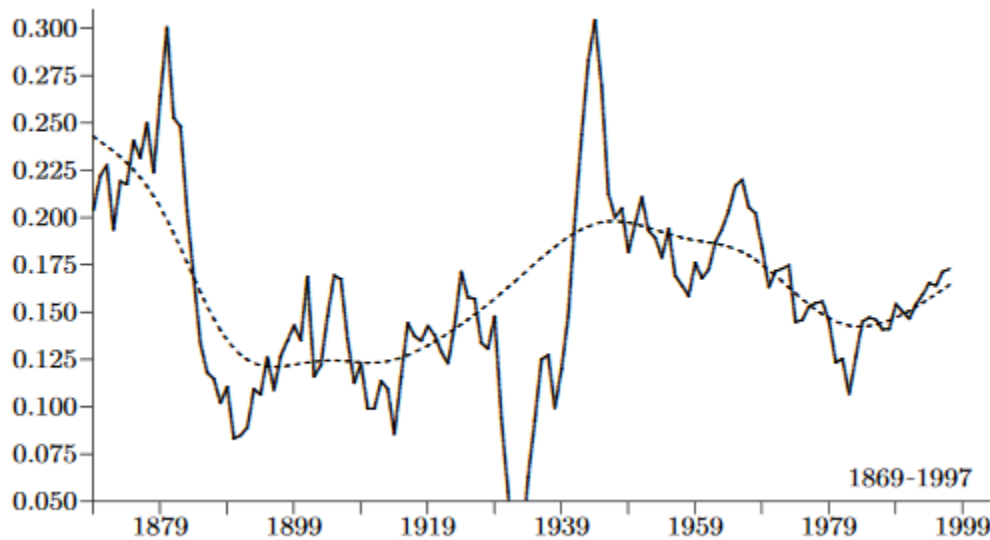


¹⁰ Retrieved from FRED, Federal Reserve Bank of St. Louis
<https://fred.stlouisfed.org/series/M04051USM324NNBR>, May 14, 2017

Source: (Warren, Pearson, & Stoker, 1932)

The 32 years long deflationary process was the consequence of a combination of severe price competition and increasing efficiency (Fligstein, 1993) that resulted from the mechanics of the form of competition we have described in this section. ***In the absence of barriers to entry, and given the high fixed costs that characterized the industries that led the way during the second half of the XIXth century in the United States, unregulated cutthroat price competition resulted in a deflationary process that was unsustainable for firms.*** The constant overexpansion and price cuts this form of competition caused three economic downturns (1873 to 1877; 1885 to 1887 and 1893 to 1897), the last one being the most severe (Hoffmann, 1956). Price cuts were too pronounced to counter the cost of expansion and productivity increases were not enough to counter the downward effect this had on profits. Moreover, “contrary to what classical economists maintained, capital in those industries was hardly fluid: as a matter of fact, it was very difficult to withdraw or redirect it. Hence, overproduction was a semi-permanent phenomenon in many heavily-capitalized sectors of the economy” (Giocoli, 2014). Therefore, the last two economic downturns would result in a strong and long decline in the profit rate of the private sector, which was cut by more than 3 in less than 10 years during the 1880s (cf. Figure 8), causing what Duménil and Lévy (2001) consider to be one of the three structural crises of capitalism.

Figure 8: The private nonresidential US economy: The profit rate (regular line) and its trend (dotted line) – (1869-1997)

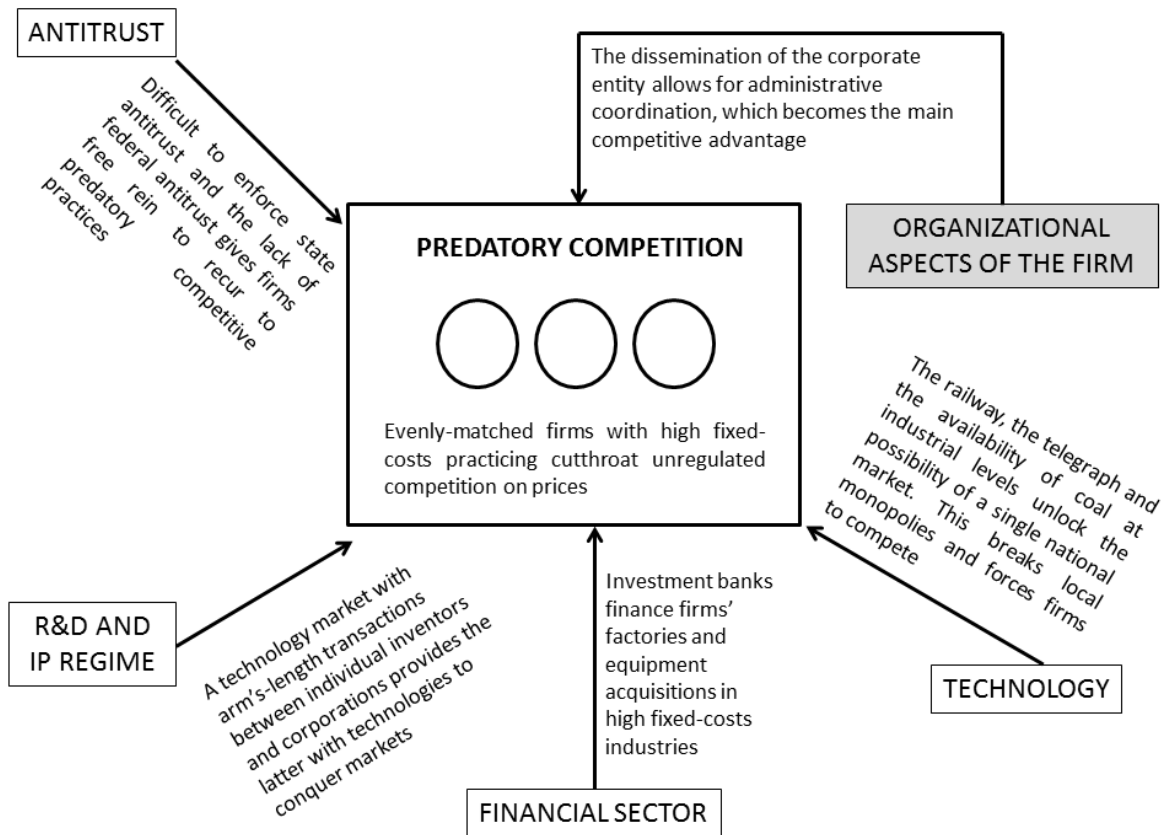


Source: Duménil & Lévy (2001)

In a nutshell, the predatory form of competition that developed in the United States between the 1840s and the 1860s was characterized by strong and unregulated (in the broadest sense of the term, as we will

develop in the next section) rivalry between firms that competed horizontally and required large amounts of capital investment to expand and survive. In the absence of effective state regulation or market power, competition led to a profound profitability crisis. The predatory form of competition offered a valuable lesson to the nascent corporation: the sustainability of capitalist competition required more than intrafirm coordination. If competition was to survive, market power would be necessary.

Diagram 1: The predatory form of competition (circa 1840s to 1860s)



NB: The dominant institution of the form of competition is shaded. Arrows from other institutions indicate the key direct and indirect institutional complementarities with the dominant institution.

2 Collusive competition (circa 1870s to 1910s)

"I like a little competition, but I like combination better . . . Without control you cannot do a thing."

J.P. Morgan

The period between the 1870s and the 1920s can be analyzed as a coming of age of the American corporation in two interconnected senses: regarding its internal structure and in terms of its relation with its competitive environment. Internally, the corporation continued its organizational innovation path towards controlling production and distribution and incorporated the control of innovation. Regarding its environment, the corporation understood that predatory competition was a form of competition too unstable for it to grow and prosper and, for the first time, it tried to control its competitive environment through explicit coordination with competitors, inaugurating so a novel form of form of competition that we have labeled 'collusive competition'. Additionally, the period represents a coming of age also in terms of scale. "Between 1869 and 1889 the average American factory doubled in size, capital invested per manufacturing worker almost trebled and total factory productivity grew at an exponential rate" (Giocoli, 2015). Let us start with the competitive environment.

As we have described in the previous section, predatory practices and price wars pushed firms out of the market once the expansionist phases were over. The Panic of 1873 functioned as a warning sign for firms about the need to make changes in the way competition was being handled. The first solution that was attempted was setting up horizontal coordination between competitors in order to stabilize prices and production and, in that manner, aborting future overproduction crises. The mechanisms deployed by firms to do so were pools and trusts, the former being predominant in the 1870s and the 1880s while the latter were mainly used during the 1880s (Blicksilver, 1955), although pools had been in use to a lesser extent before the Civil War.

It is important to point out that pools were not legally jeopardized at the moment. In Roy's (1999, p. 186) words, "the fact that the pool would overtly form itself as a company and go to court to enforce the contract indicates that it had a reasonable expectation that the contract would be upheld. Moreover, the court drew the distinction between partial and general restraint of trade. Only the latter was considered illegal. But the distinction between partial and general restraint was vague. (...) The state was in the process of specifying the rights, entitlements, and responsibilities it would enforce". The two key economic concepts on which the lawfulness of combinations depended at the time (which were drawn

from Classical competition theory, which we will analyze it in depth in the next chapter), were contractual liberty and freedom from coercion. Market structure was not taken into account. Then, arrangements such as price-fixing were perfectly legal, since it was considered that competitors' freedom to act was not being artificially restrained (Giocoli, 2015). Therefore, although minor legal challenges existed, firms did not refrain from recurring to pools for cartelization purposes because, at the time, those forms of coordination were far from being unambiguously considered illegal. A stunning (in the eyes of a contemporary reader) proof of this is that "trade journals, ordinary newspapers, association minutes, and other public activities openly and unabashedly discussed price setting" (Roy, 1999, p. 189).

Pools were used to coordinate prices and production quotas and to allocate geographical markets. In some cases, patent pools were used as a mechanism to enforce the agreed-upon prices and quotas¹¹. Typically, a company pooling a bundle of patents needed to produce a single good would be created and members of the pool would pay royalties for its use, the right of being able to remain a licensee depending on the compliance of prices, quotas or geographical allocations of markets set by the pool¹². This was the case of, for example, the Great Sewing Machine Combination, founded in 1856, the first national pool and the first patent pool in the history of the United States (Hounshell, 1985). Pools appeared mainly in industries with high levels of capital investment, low growth, low profits (the latter two characteristics signaling economic difficulties induced by predatory competition) and few firms (which simplified the coordination process) (Fligstein, 1993). In other words, **the profile of the industries that have recurred significantly to coordinating competition through pools is the same as that of the industries that suffered the most from the predatory form of competition, which indicates that the collusive form of competition that emerged in the 1870s was an answer (one among other possible ones) that firms brought forth in order to move forward from the ruinous predatory competition they were stuck in.**

It is important to highlight that, in the business and legal environment of the end of the last quarter of the XIXth century of the United States, the main goal of these coordination practices, which seem today as the antonym of competition, was not to curtail or to annul it, but rather to *coordinate* it and to avoid in that manner the death sentence that unregulated competition had put on itself. "In almost every case, actors in the firms [participating in a cartel or a pool] were not trying to collect

¹¹ There are conflicting views in the literature regarding the role that patent pools have played as market power mechanisms in the business history of the United States. We share Mangolte's (2012) nuanced view according to which there have been three different types of patent pools in terms of their goals: those aiming at controlling markets and industrial activities, those seeking rent extraction and those created to allow free access to techniques and to unlock the development of a nascent industry. We will see along this chapter how these types of pools have predominated in different forms of competition.

¹² Until 1909 patent pools were automatically approved (Christophers, 2016).

monopoly rents, but instead were trying to guarantee themselves an adequate profit and continued existence” (Fligstein, 1993).

Nevertheless, these agreements did not work. From an aggregated perspective, as Figures 6 and 7 illustrate, the fact that prices did not start recovering until the mid-1890s (when, as we will explain in the following lines, consolidation strategies took over coordination strategies) and that profits continued to decline until around 1890 (cf. Figure 8), shows that coordination strategies were unsuccessful. Moreover, many industry studies, empirical investigations and case studies (Chandler, 2002; Fligstein, 1993; Lamoreaux, 1988, 2010; Roy, 1999) have offered solid evidence supporting this claim. The reason of this failure is also consensual in the literature: pools were unstable because they were difficult to enforce; firms would regularly deviate from the agreements to outcompete their rivals. Further on, the birth of federal antitrust would precipitate the switch from pools and trusts to consolidation strategies.

As the inherent instability of pools became apparent to firms, they started to use trusts, which provided a more binding horizontal coordination mechanism. The first and one of the most famous trusts in the history of the United States was set up by Standard Oil. This legal innovation, which consisted in bringing together the stocks of disparate firms under a single management (the trustee), was in fact conceived by S.C.T. Dodd, the legal counsel for Standard Oil (Fligstein, 1993). But trusts were short lived. **While pools did not face legal challenges but failed in assuring horizontal coordination that would put a stop to predatory competition because of their weak enforceability, trusts presented the opposite features: enforceability was manageable, but the courts quickly put a stop to them.** In the late 1880s, a series of cases in different states ruled that trusts agreements restrained trade and, hence, violated corporate charters. Therefore, “firms that remained in trusts would lose their charters and forfeit the right to do businesses” (Fligstein, 1993). This series of cases fostered the animosity towards large firms and their practices seeking to restrain trade, which translated in a push for a federal antimonopoly act. As a result, by 1890 twelve states had passed legislation against trusts and other restraints of trade. By 1900, this number rose by 15 (Fligstein, 1993). This process would reach its tipping point with the passing of the Sherman Act, which in 1890 became the first federal antitrust law of the United States and the second one of the world after Canada’s, which had been passed the previous year.

The Sherman Act represented a profound shift in the competitive environment because it gave the federal government (and not just state governments) the power to regulate restraints of interstate and international trade. This meant that firms could no longer use their national scale to bypass restrictions imposed by states that tried to control what they considered to constitute restraints of trade. The act specified that “every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or

commerce is illegal” and that “every person who shall monopolize, or attempt to monopolize or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several states or with foreign nations, shall be deemed guilty of a misdemeanor”. **The phrasing of the Sherman Act is of paramount relevance to understand the transformations that the collusive form of competition underwent for two reasons. First, it gave the federal government a scale equivalent to that of corporations in terms of antitrust enforcement, something that was lacking and had been limiting states’ capacity to regulate competition. Second, it explicitly blocked the way to the most enforceable legal strategy of horizontal coordination existing (trusts) and created legal grounds to block any kind of arrangement *between legally independent firms intending to restrain trade or to monopolize.***

Given the common law tradition of the United States’ legal system, the effect of the Sherman Act would depend on courts’ interpretations of the meaning of “restraint of trade” and “monopolize”. The jurisprudence on how to interpret these terms that was developed during the “formative era of American antitrust” (1890-1914, i.e. between the Sherman Act and the Clayton Act) (Giocoli, 2015) would shape firms’ behaviors by defining which behaviors were tolerated by the law and which ones were not. Three phases (each of them defined by landmark cases and a handful of minor cases in line with them) can be distinguished during the formative era: the common law phase, the literalist phase and the rule of reason phase (Giocoli, 2015).

The common law phase was the first interpretation the courts made of the Sherman Act and its landmark case was a decision by Ohio Circuit judge and future Supreme Court Justice Howell Jackson on a whisky trust. During this phase, it was considered that liberty of contract, unless restrained by trusts’ unlawful practices, would be enough to protect competition through free entry and rivalry to obtain customers. The key point of this doctrine is that it considered that freedom of contract implied the freedom to enter a combination in order to preserve “fair and healthy” competition in phase of the possibility of ruinous price wars. Indeed, “starting from the 1870s destructive competition began to appear regularly as a courtroom defense raised by firms accused of having formed unlawful cartels or combinations” (Giocoli, 2015).

Nevertheless, this interpretation of the Sherman Act did not last long. In 1897, a tight 5-to-4 vote of the Supreme Court in the *United States v. Trans-Missouri Freight Association* case set the beginning of the literalist phase of the formative era of American antitrust. This ruling considered that all price-fixing agreements violated the Sherman Act regardless of the reasonableness of the prices they set. While in previous rulings reasonableness of prices (understood as prices that would not be so low as to lead to

bankruptcy) was an argument employed to validate combinations, this ruling considered that only competitive prices were reasonable.

The literalist interpretation of the Sherman Act left firms seeking to regulate horizontal competition with little options other than consolidation (Chandler, 2002; Fligstein, 1993; Freyer, 1995; Lamoreaux, 2010). Twenty-four years after the Sherman Act, the 1914 Clayton Act reinforced this pattern by specifying a list of forbidden practices such as tied sales or price discrimination. Paradoxically, it also offered the first legal tool to control horizontal mergers through stock acquisition (Encaoua & Guesnerie, 2006) although, as we will explain further on, this clause was generally bypassed or not enforced.

Indeed, although the Sherman Act gave governments a strong power to regulate restraints of international and interstate trade and restrictive practices, it did not apply to consolidation strategies. While it was almost straightforward that trusts and pools were designed to restrain trade, it was difficult to prove in court that a consolidation had the same purpose. The common law of contracts in restraint of trade on which the Sherman Act was based was “quite tolerant of business divisions within a single firm, or a firm’s decision about how to grow larger (...) Clearly, the union of two or more persons into a corporation legal under state law was not automatically an unlawful combination or conspiracy in restraint of trade” (Hovenkamp, 1990). In other words, the Sherman Act had no doctrinal power to stop mergers and, by not allowing firms to control output and prices through agreements of any sorts, fostered mergers (Freyer, 1992). Moreover, states did not stop corporations from selling out to out-of-state interest or, inversely, did not prevent out-of-state corporations from buying local corporations for three reasons. First, states did not want to drive business activity away, so they chose not to fight the holding company (McCurdy, 1979). Second, had states tried to do so, corporations would have sued them alleging that they were preventing firms from disposing of their property as they saw fit (Fligstein, 1993). Thirdly, “that the power to charter corporations gave states full regulatory authority to proceed against mergers was acknowledged by the federal courts. But this power was not very useful when multi-plant giants could respond to state regulation by securing a charter from a friendlier jurisdiction or even by closing down their enterprises in the state”. As a result, “after a brief flurry of antitrust activity in the 1880s and the early 1890s, the states largely gave up. If there was going to be an antitrust initiative, it would have to come from the federal government” (Lamoreaux, 2010).

The lack of enforceability of pools, a series of economic downturns and the serious legal obstacles faced by trusts when the literalist interpretation of the Sherman Act of anticompetitive practices *between legally independent firms* pushed the firms that had been (unsuccessfully) recurring to cartelization strategies to

the first merger wave of American history, which took place between 1895 and 1905. This interpretation of the first merger wave's origins resting on the fact that it was the only way out allowed by law available to firms suffering from predatory competition and trying to coordinate horizontal competition is supported by two empirical facts. First, as Fligstein (1993) has empirically showed using Nelson's (1959) original data, this merger wave was in a stunning 78% horizontal. Second, both Fligstein (1993) and Lamoreaux (1988) have provided econometric evidence showing that the firms that participated of the first merger wave were mainly located in industries that were "capital-intensive, mass production industries in which firms were closely matched and in which expansion had been rapid on the eve of the Panic of 1893" (Lamoreaux, 1988). In Fligstein's words, "the strongest predictor of whether or not an industry participated in the merger movement was whether or not its member firms participated in cartels. Second, the central factors in the formation of cartels had been high levels of capital investment and low levels of profit. These conditions characterized the high-investment production markets where the competition was heaviest" (Fligstein, 1993). This characterization matches that of the firms that had suffered the most the effects of the predatory competition mode and had formed pools to counter those effects in the 1870s and 1880s.

The finance sector also played an important role in this merger wave, although the underlying causes are those we have just presented. Financing through a market of securities was a necessary but not sufficient condition for the merger wave to happen. Investment banks that held securities of corporations that had been failing in regulating competition through pools and trusts surely fostered and financed mergers in order to reverse the downward tendency of profits of those corporations. Moreover, the 1893-1897 financial panic also worked as a catalyzer of the merger wave in the sense that the financial institutions holding stocks in American corporations tried to protect themselves by financing lucrative merger deals that, in the anticipation of an increase of profits, would raise the price of the stocks of the consolidated companies. In this climate of financial euphoria, it is likely that many firms that would not have merged ended up doing it pushed by imitative behavior (Fligstein, 1993) and investment banks' interest in getting merger fees (Christophers, 2016). Therefore, financial institutions, which owned considerable stocks in the main American corporations at the end of the XIXth century (Minsky, 1990), passed from a role of financing machines and factories to a role of financing trusts and mergers. **This shift in the role of finance, which Minsky considered to define a period stretching from 1890 to 1933 he labelled "banker capitalism" (Minsky, 1990, 1992), is testimonial of the institutional complementarities between antitrust law, finance and firms' strategies that have shaped the collusive form of competition at the end of the XIXth century.**

The merger wave had a considerable magnitude both in terms of the number of firms that engaged in it and the market shares obtained after the mergers. In his seminal *The First Merger Wave*, Nelson (1959) estimated the number of net firms disappearances over the 1895-1904 period at 3,012, out of which 2,493 correspond to consolidations. Lamoreaux (2010), in turn, found the number of consolidations during that period to be over 1,800 for manufacturing firms. In terms of market shares, it is remarkable that “of the ninety-three consolidations whose market share it is possible to estimate, seventy-two [i.e. 77%] controlled at least 40 percent of their industries and forty-two [i.e. 45%] at least 70 percent” (Lamoreaux, 2010). However, despite its success in terms of the resulting market shares of consolidated firms, the first merger wave was unsuccessful in restoring profitability. An in-depth empirical study by Livermore (1935) has shown that only 44% of the mergers of the first merger wave succeeded in at least matching the average profit rate of the manufacturing sector. Consolidated firms were in most cases unable to maintain their market dominance in the long-run. Lamoreaux (1988) explains that this was due to the fact that consolidation costs were high because firms purchased overpriced and old depreciated plants; at the same time, the rise of prices that consolidations allowed for attracted new competitors, which undermined the consolidated firm’s dominant position. A cross-look at Figures 7 and 8 confirms this interpretation. While the beginning of the merger wave (around 1895) coincides with a pronounced upward shift in the long-run dynamics of prices, profits started growing again approximately from 1890 to 1905, that is to say, during the merger wave itself. But after the merger wave was over and firms had to start overinvesting again to fight new entrants, profits initiated a downward tendency that in one decade took them back to pre-merger-wave levels. **In other words, in the absence of barriers to entry, horizontal market power, even after having evolved in terms of mechanisms from collusion to horizontal consolidation, was proved to be unstable and ineffective in securing high profits.**

Turning now to the internal aspects of the corporation during this ‘coming of age’ period, we can understand better how the (unsuccessful) quest for horizontal market power was not incompatible with a continuous push for efficiency gains and competitive tactics. When the period that we have labeled ‘collusive competition’ started, some key managerial practices that had been developed in the 1850s and the 1860s (internal statistics, periodical reports, alternative accounting practices to double-entry bookkeeping) had become standard practices. By World War I, the corporation had become the hegemonic business institution in the United States (Chandler, 2002). In other words, the practices that had first defined administrative coordination during its development along the predatory competition phase consolidated during the collusive competition period. But organizational innovation did not stop there. The collusive competition period was also a period that nested a major revolution in management: Taylorism.

During the 1880s and the 1890s, Taylorism began developing and by the 1910s it had a peak of influence (Woodham, 1997). **The relevance of this innovation in light of our analysis of the evolution of forms of competition lies in that scientific management implied a qualitative leap in the corporation's road to compete on the basis of its capacity to control in the most efficient possible way the entire production and distribution process. While the corporation had developed administrative coordination practices to control efficiently everyday *managerial coordination tasks*, it was not until the development of scientific management that it was able to fully control *the production process inside the factory*.** It did so in two ways. On the one hand, the techniques detailed in Taylor's seminal scientific management paper of 1895 (extreme specialization, routines, time and cost analyses, the creation of a planning department, etc.) were effective in rationalizing the production process in order to modify it so it would serve the economies of speed on which competitive advantages relied. On the other hand, and perhaps most importantly, Taylorism took the control of the production process away from workers. This happened in two ways. On the one hand, practices oriented towards the management of workers such as the payment of salaries on the basis of the number of pieces produced succeeded in taking away from workers the control of the production process by breaking-up workers' solidarity inside the plant. The salary by pieces scheme, for example, was successful in offering a guarantee to workers that would drive them away from loitering and resistance practices fostered by unions and would substitute worker's economic solidarity mechanisms such as the union's fare or the union-run mutual funds (Coriat, 1979). On the other hand, "with the Time and Motion Study, Taylorism acted as a gigantic process of expropriation of trade workers' skills, which were then parcelled out and redistributed to unskilled workers. Indeed, until the arrival of Taylor, production skills were first and foremost the property and 'monopoly' of skilled workers. This knowledge, mainly uncoded, was transmitted from one generation of workers to the next through the system of apprenticeship. Taylor's scientific management brought this situation to an end, by imposing modes of work division and organisation that were now decided by the management. The organisation of work was then claimed by employers' organisations as a 'management right', in the face of long-running protestations from skilled workers, - and their unions - claiming the right to choose what they deemed to be the most efficient operating modes" (Coriat & Weinstein, 2011). This submission of labor to capital's needs in the production process benefited from special historical momentums. Between 1880 and 1915, there was a second immigration wave in the United States that came mostly from Southern and Eastern Europe. These workers, contrary to the ones that had arrived to the country during the previous immigration wave (1815-1860), had no industrial experience or technical knowledge, which impeded them from controlling the production process through their possession of tacit knowledge on production. In addition, self-sufficiency through agriculture was not an option anymore to these newcomers because the Western frontier of the country was already

owned by land and iron speculators and railroads had modified the natural and social landscape of the West. Therefore, this 'ready-made' male working force (on which capitalists did not need to invest in educating or in feeding its families) had no option but to find employment in industrial corporations under the rule of scientific management (Coriat, 1979).

Then, while competition pressured the infant corporation to develop organizational and technical innovations that would revolutionize capitalism, horizontal market power was the strategy that it employed to try to cast away the self-destroying effects of unreined competition. Even after the development of antitrust and successive economic downturns left firms that were trying to flee from the ruinous effects of competition with no other option but to build horizontal market power (this time emanating from concentration, not from collusion), market power was still playing the role of *coordinating* competition, not eliminating it. As a result, firms were not adopting a rent-seeking strategy but, on the contrary, were constantly innovating in order to outcompete their rivals in the (now consolidation-supported) collusive competition regime.

Administrative coordination and management techniques were not the only competitive weapons firms developed during the collusive competition era. Intellectual property was also employed. One of the turning points in the history of American intellectual property, the shop right doctrine, took place during this period. Since the 1850s, firms were able (later on they would obtain the *right* to) acquire an exclusive license over their employees' inventions. The underlying logic was that when an employee lets its employing firm to use his/her invention he/she is implicitly consenting to grant it a license. At the end of the XIXth century, the logic shifted to the 'shop right doctrine', which stated that if an employee produces an invention while working for his/her employer (who, in turn, bears the costs of the invention in terms of wages and facilities), the employer had a right to use the invention without paying the employee, who nonetheless remained the owner of the intellectual property (Fisk, 1998). The shop-right doctrine represented an additional step towards an intellectual property regime centered on the firm instead of the individual.

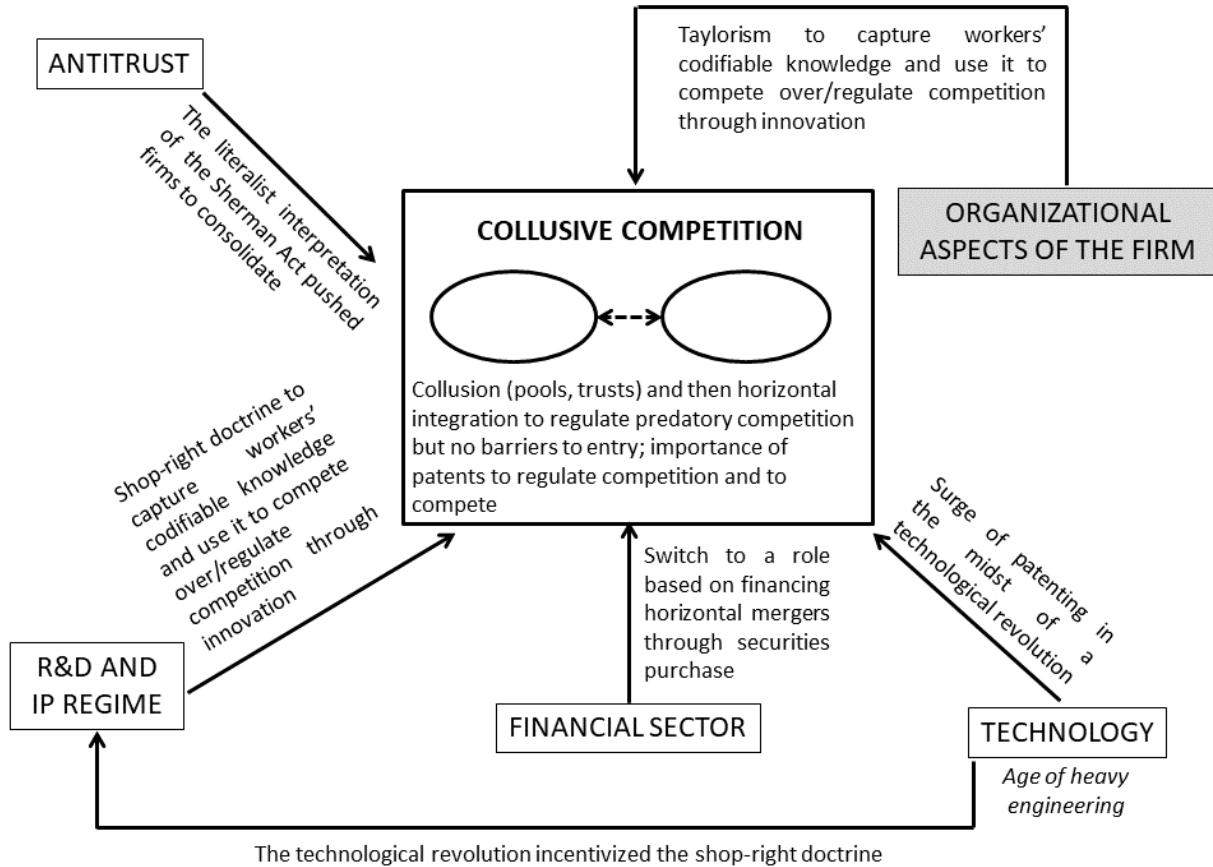
The shop-right doctrine has to be understood as another mean by which the firm, just as it was doing with Taylorism regarding uncoded knowledge, was capturing coded knowledge from workers (Coriat & Weinstein, 2011) in order to master it as a competitive weapon. Not coincidentally, the collusive competition period (1870s-1910s) matches the second technological revolution (1875-1908) that characterized the main firms of the American economy (Perez, 2010). This technological revolution, centered on heavy engineering (electrical, chemical, civil, naval) and steel (industries with the high fixed-costs that we have identified as a driver of necessity of

coordination to escape predatory competition), was marked by one of the more pronounced surges in patenting in American history (cf. Figure 5). Firms understood that they had to control the codified knowledge on which this technological revolution (and, by extension, their competitive position) depended.

On the same line, in 1905 Congress passed for the first time a law that protected trademarks in domestic commerce. “As Mira Wilkins has argued, the timing of the legislation reflected the new efforts of large firms competing in oligopolistic markets to use product differentiation to preserve and expand their market shares” (Lamoreaux, 2010).

We can conclude this section by highlighting that the collusive form of competition was the first response of corporations to the creation of a national market (which was itself partially the result of the deployment of the railway and the telegraph by corporations) that had thrown them into an unregulated competition environment in which they had to face each other as rivals. Coordinating the competitive process in order to avoid the ruinous effects of predatory competition through market-power-creating horizontal coordination, be it in the form of collusion or in the form of horizontal consolidation, was the most apparent solution. But in the absence of barriers to entry, not even consolidation could fulfill the promise of eradicating the evils of predatory competition. If profitability was to be restored, market power would have to play a different role than coordinating competition. It would have to constrict it.

Diagram 2: The collusive form of competition (circa 1870s to 1910s)



NB: The dominant institution of the form of competition is shaded. Arrows from other institutions indicate the key direct and indirect institutional complementarities with the dominant institution.

3 Constricted competition (circa 1920s to 1945)

By the 1920s, the major American corporations had understood that horizontal coordination of competition through collusion or consolidation were not enough to stabilize prices and to restore profitability: without barriers to entry horizontal market power was of little use. The strategy that powerful corporations succeeded in deploying and translating into a form of competition consisted in dominating markets through efficient mass production while shielding themselves from competition through the combined use of three different barriers to entry: intellectual property (through the means of patent cartels and trademarks used to restrain trade), vertical integration and collusion. As we will show along this section, this course of action responded to the previous experience of firms during the collusive

form of competition as well as to a particular transitional historical period regarding technology, antitrust enforcement and international political and economic history in general. As we will show, World War I and the Great Recession played an important role in creating a political environment in which this market-power-based form of competition could be tolerated and even nurtured by the federal state until the mid-1930s. After that period, a general awareness about the necessity of more competition would revive, but it would take a decade for institutions (notably the intellectual property regime and antitrust) to accommodate and for mass consumption to establish itself so that a new form of competition, Fordist Competition (1945-1970s), could take over. In that sense, the Constricted Competition era is to be understood as a transitional period.

During the 1920s, the Taylorist management revolution was boosted by the spread of the semi-automatic production chain. The introduction of this technology changed radically firms' capabilities for various reasons and, in doing so, influenced the way in which they competed with each other. From a technical point of view, the semi-automatic production chain lowered transportation and manipulation costs of mainly heavy objects inside the factory, multiplying in that manner production capacities and increasing productivity. This technological advance, in turn, was possible because of the ongoing energetic revolution of petrol-based energy, which allowed for the use of electricity and high capacity engines inside the factory (Aglietta, 1997). Moreover, the semi-automatic production chain requires less workers for maintenance and allows machines to specialize in operations (Coriat, 1979). From the point of view of management, the semi-automatic production chain reinforces the Taylorist logic: the chain (and not the workers) controls the pace of production, the labor process is broken-up into specialized execution tasks that require little training and the spatial distribution around the chain allows for a panoptic mode of surveillance. Conception tasks, on the other hand, are the sole responsibility of managers and engineers. Therefore, with the introduction of the semi-production chain the firm could increase speed (and hence productivity) both by technologically accelerating the production process and by diminishing dead times through a higher control of the labor process by management (Coriat, 1979).

Therefore, mass production of standardized products became a reality in the 1920s American economy with the production chain. This radical innovation, along with the energetic revolution that made it possible, inaugurates an era that Carlota Perez (2009) considers to span from 1908 (year of the introduction of the first Ford-T model) and 1971 and to be technologically characterized by oil, the automobile and mass production.

But in order to succeed in this mass production landscape, firms needed to create sufficient demand and/or charge enough to make the most of the economies of speed the semi-automatic production chain

allowed for. In order to create demand, firms relied on heavy advertising. Although manufacturers and retailers had used advertising before, the 1920s represent a watershed in terms of advertising expenditure. During this decade there was a proliferation of national brands. Stimulated by advertising, product style started to change rapidly to enhance consumer demand. The rise in advertising expenditure of the decade was allocated mainly to maintaining the reputation of tradenames and trademarks and, in doing so, building consumer loyalty (Fisher, 1999; Fligstein, 1993).

Pricing changed accordingly. While in the past pricing had been ex-post (i.e. firms would constantly adjust their prices in reaction to demand and competitors' prices), in the 1920s firms started using ex-ante pricing. Prices were maintained regardless of the fluctuations in demand and competitors' prices; they were calculated based on normal costs (i.e. costs of production at a use of capacity judged to be normal) and a desired level of profit. This implied that prices were no longer the adjustment variable that resulted from competition in the market, but an administratively defined variable consistent with a profitability *strategy*. Consequently, economic gains stopped being measured by mark-ups. Instead, the return on investment indicator, which had been introduced in 1917, started to be used. This switch in the way pricing, profitability and long-term decisions were planned within the firm (the fact that managers started to take care of strategic decisions instead of day-to-day decisions) translates a tipping point in the maturity of the corporation, in which administrative coordination passes from the mere "monitoring of current production and distribution of goods" to the "allocation of resources for future production and distribution" (Chandler, 2002).

This new competitive approach centered on dominating markets through mass production and in which prices were high enough to restore profitability and stable enough to remain ex-ante required some conditions to succeed. On the one hand, a lead firm should be able to establish ex-ante a price that competing firms would not want to or could not beat, either because of the lead firm's superior efficiency to hold a price war (contrary to the small number of evenly matched firms characteristic of the predatory form of competition) and/or because of the lead firm's market power. Otherwise, ruinous price wars such as the ones that had characterized the predatory form of competition would be triggered and ex-ante pricing would be impossible. Moreover, weak competition was a requisite for firms to be profitable because the institutional changes required to develop mass consumption that would come after World War II (WWII) with Fordism did not exist yet. Therefore, mass consumption of cheap products was not an option to obtain profits on small margins over large quantities. Prices needed to remain sufficiently high and quality and advertisement were not enough to fulfill that mission; some sheltering from competition was needed as well. The collusive form of competition that had spanned from the 1870s to the 1910s had been unsuccessful in creating barriers to entry and therefore in restoring profitability. Firms

had learned that lesson and, given the possibility of exploiting a nascent competitive strategy that required barriers to entry more than ever, they started building them. **In other words, market power had to be reshaped to forge a new successful form of competition.**

Barriers to entry took many forms during the 1920-1945 period. One of them was vertical integration. As we have shown in the previous section, antitrust enforcement had left firms with little option but to consolidate in order to exert horizontal market power and avoid price wars. But this horizontal market power lacked barriers to entry, which explains why they were unsuccessful in restoring profitability during the collusive competition period (1870s-1910s). Following the same logic of consolidation as an antitrust-immune strategy of control, firms started to integrate vertically. The strategy consisted in relying on “size, integration, and relative effectiveness of the large firms as a potential threat to competitors” (Fligstein, 1993). Competitions was discouraged in that manner because large integrated firms could control access to raw materials and distribution channels and produce at a lower cost by better administratively controlling the flow of goods along the supply chain (Chandler, 2002). This allowed them to acquire large market shares and act as price leaders by setting relatively high prices without having to fear a price war by non-vertically integrated competitors with higher costs, less resources and less control of the supply chain.

The empirical evidence available confirms that vertical integration was a major part of the strategy employed by firms that defined the constricted form of competition. Using four different sources of data about the 100 largest American firms, Fligstein (1993) finds that the percentage of firms with some amount of vertical integration (measured roughly as “whether or not a firm controlled some aspect of raw material production”¹³) increases between 1919 and 1959. For the 1919-1929 period, the number is at 51% and it keeps growing until the 1948-1959 period, where it attains 82% before starting to decline. In another empirical study on vertical integration, Livesay and Porter (1969) find that “in the period 1899-1948 there was a general trend toward greater vertical integration in American manufacturing”. **Therefore, the industrial organization landscape that characterized the constricted form of competition was that of vertically integrated oligopolies.** This vertical integration movement took place mainly through mergers in what is known as the second merger wave of the United States, which took place during the 1920s and was characterized by vertical mergers (Eis, 1969; Stigler, 1950) or horizontal mergers in markets that were already vertically integrated (Fligstein, 1993). As with the

¹³ Although Fligstein does not point it out, it is important to highlight that this is a measurement of backward integration.

previous merger wave, investment banks assured the necessary financing through the purchase of securities.

As important as vertical integration has been for price leaders to cast out competition by discouraging competitors to trigger price wars, other strategies that built barriers to entry were deployed. Maintaining high prices while keeping competitors out of beating them would require more than a threat of launching a price war they could not win: barriers to entry were needed. One of them was intellectual property. The two main forms this strategy took were the use of trademarks for anti-competitive purposes and patent cartels¹⁴.

As we mentioned above, the constricted competition period was inaugurated by a surge in advertising expenditure during the 1920s that aimed at developing customer loyalty attached to trademarks and tradenames. Consequently, protection of these intellectual property assets was needed to prevent competitors from free-riding on advertisement investment (Fisher, 1999), and the 1905 law protecting trademarks in domestic commerce filled that gap (Lamoreaux, 2010). Nevertheless, trademarks were also used to restrain trade because **before the 1940s intellectual property, just as consolidation, was largely immune to antitrust**. Antitrust, which, as we saw above, had become federal and started to be enforced more seriously with the 1890 Sherman Act, did not take action against trademarks or copyright until the postwar era (Christophers, 2016). Taking advantage of that loophole, before World War II, and especially after the 1920s boom in advertising and the front role of trademarks it led to, firms used trademarks to practice “illegal division of fields, illegal division of markets and invalid discriminatory price-fixing, pre-emption of markets and uniform price-fixing, quantity control, and, in general, the support of domestic monopoly” (Timberg, 1949). A landmark example of this is American Tobacco, which was founded during the first merger wave and by 1907 controlled between 80% and 90% of cigarette trade. It was investigated by the Department of Justice (DOJ) and broken-up in five firms in 1911. But through trademarking and “a major intensification of advertising and promotion” (Brandt, 2009), each of the new companies focused on a single brand, Lucky Strike, which served as a mean to coordinate prices. As a consequence, prices did not go down after the break-up (Christophers, 2016).

The other intellectual property barrier to entry employed by firms to keep competitors away during the constricted form of competition was patent pools. As we have mentioned above, following Mangolte’s (2014) study of patent pools in the history of the United States, we cannot say that all patent pools were used to exclude competitors as ‘patent cartels’. In some cases, patent pools were used to untangle

¹⁴ Another ‘hybrid’ intellectual-property-related strategy used besides the two we have just mentioned was merging to constitute an intellectual property portfolio robust enough to dominate a market. This strategy was antitrust-immune at the time.

conflicts regarding complementary techniques owned by different firms that were hindering the development of industries. Nevertheless, patent pools were also used for cartelization purposes. Between the 1920s and the 1940s, this use of patent pools became more and more relevant because of the particular stage of the long-term transformation of the American intellectual property regime the country was going through after the 1920s. As we have shown in the previous section, with the development of the shop-right doctrine at the end of the XIXth century, the firm gained increasing power over the use of its employees' patents. At the same time, certain court rulings affirmed the employer's right to the ownership (and not simply the use) of an invention from the moment that the employee had been recruited and paid to invent. But it was essentially after 1920 that a doctrine founding the ownership of inventions on the employment contract was established. "In 1933, a Supreme Court ruling presented it as an obvious principle that 'the respective rights and obligations of employer and employee, touching an invention conceived by the latter, spring from the contract of employment ¹⁵'" (Coriat & Weinstein, 2011). In parallel, while "relatively few large companies invested in full blown R&D laboratories before the 1920s" (Lamoreaux, 2010), after that period in-house research began to be increasingly common in large corporations. The market of patents issued to independent inventors was dying during the constricted competition period; firms were increasing their control over the production of knowledge. The beginning of the constricted competition era was also that of the end of the 1870-1920 era of "independent inventors" (Hughes, 2004). This means that, from the 1920s on, firms started increasingly owning patents, not just using them. The numbers confirm this long-term pattern. As Merges showed, "in 1885, only 12 percent of patents were issued to corporations. Slightly more than one hundred years later, the proportions had completely reversed: by 1998, only 12.5 percent of patents were issued to independent inventors" (Merges, 2000). The introduction of firms' ownership over their employees' inventions in the labor contract and the development of in-house R&D by firms, two phenomena that started developing in the 1920s, are certainly the kickoff of this dramatic transformation in the ownership of patents over the 1885-1998 period. Since firms were increasingly owning patents, they had increasing opportunities of constituting patent pools. And because patent law was older¹⁶ than antitrust law and untouched by it (as we will see in the next section, it was not until 1942 that patents could no longer be used to cartelize), firms took the opportunity of using their enlarging patent portfolios to constitute patent pools for collusion purposes and, in doing so, excluding competitors and keeping prices high (Perelman, 2003). An

¹⁵ *United States vs. Dubilier Condenser Corp*, 289 US 178, 187 (1933). Quoted by Fisk (1998).

¹⁶ The origins of patent law in the United States go back to the early colonial period, when individuals who invented new products could ask for colonial governments to grant them exclusive commercial rights to them. At the end of the XVIIIth century, states started to pass general patent laws. By 1790, the country had a federal Patent Act, while the 1787 constitution had given Congress the power to grant patents and copyright protection.

example of this is Standard Oil, which after having been forced to break-up in four firms in 1911 for having violated the Sherman Act, re-entered the top 30 Dow Jones index in 1924 through Standard Oil California and Standard Oil of New Jersey using a price-fixing patent pool made of patents over cracking methods of which these two firms participated (Kemnitzer, 1938). This use of patent pools was consistent with the competitive strategy that structured the constricted form of competition. Moreover, firms also used their increasingly in-house patents to shield themselves from competition without recurring to patent pools. For example, “American Telephone and Telegraph, General Electric, Westinghouse, and numerous other firms used their laboratories to develop patents as a strategy of keeping substitute goods from being developed by their competitors and as a mean of enhancing and maintaining market share with similar strategies (Passer, 1953; Noble, 1977; Reich, 1977, 1980)” (Campbell, Hollingsworth, & Lindberg, 1991, pp. 43–44).

While between the 1920s and the 1940s firms were designing strategies to shield themselves from competition by bypassing antitrust legislation, the evolution of antitrust doctrine rendered antitrust enforcement loose during much of the period under analysis (roughly between 1915 and 1936 according to Kovacic and Shapiro’s (2000) analysis), which also contributed to shape the constricted form of competition. As we will show in the following lines, the evolution of antitrust doctrine, in turn, cannot be understood outside of the particular transitional historical context of the Constricted Competition era, a period during which the war efforts for World War I and the catastrophic economic consequences of the Great Depression favored an associationist view of the economy in which strong competition was perceived as a threat.

As we have mentioned above, the literalist jurisprudence in antitrust was in vogue since the 1897 *United States v. Trans-Missouri Freight Association* case. According to this view, all price-fixing agreements were considered to violate the Sherman Act regardless of the reasonability of the prices, a concept that had been used in courts to soften the enforcement of the Sherman Act during the previous common law phase. Nevertheless, the literalist jurisprudence was a weak equilibrium, as the 5-to-4 vote on the above mentioned case indicates (Giocoli, 2015). In 1911, two landmark decisions we have quoted above, *Standard Oil Co. of New Jersey v. United States* and *United States v. American Tobacco Company*, which rulings came with a few days delay, reverted this trend in jurisprudence and initiated what would be known as the rule of reason doctrine. In the Standard Oil case, the company was accused of several violations of the Sherman Act including threats to suppliers and distributors who did business with competitors, taking preferential rebates from shippers, the use of commercial spies or cutthroat pricing. Two matters that would set influential jurisprudence were at stake in this case. The first one was if whether, as the literalist interpretation would go, the fact that Standard Oil was a trust was in itself a

violation of the Sherman Act. The second one was if these practices, which Standard Oil did not deny, were illegal. The ruling effectively distinguished these two matters. Regarding the first one, it was decided that neither trusts nor monopolies were illegal *per se*, but only in cases where they would result in “restriction upon individual freedom of contract and their injury to the public”¹⁷. In other words, the literalist approach was not valid: the legality of combinations should be judged on a case-by-case basis using a rule of reason. The key factor was whether the freedom of contract of a combination was in violation of the freedom of contract of competitors by restricting their possibility to compete, not if the prices resulting from the combination were reasonable in the sense of high enough to avoid ruinous competition. Standard Oil was found to be guilty of violations of the Sherman Act for that latter reason, and so was American Tobacco for the same motive a few days later in a similar case. Although these two landmark cases signified a blow taken by two of the major industrial behemoths of the early XXth century (a blow they would recover from by using intellectual property to conspire, as we have mentioned above), it also turned the rule of reason into the cornerstone of antitrust enforcement for a little more than two decades. Under the rule of reason, “freedom of contract and the protection of property rights became the Supreme Court’s guiding light for antitrust enforcement until the New Deal” (Giocoli, 2015).

Ironically, the rule of reason, born from the victory of antitrust over two notorious giant corporations, opened the door to loose antitrust enforcement. The rule of reason established a difference between tight combinations (those that involved only one corporation, which were increasingly common after 1895) and loose combinations (those that involved more than one firm). While the latter continued to be illegal *per se*, the former could only be considered illegal if it could be proven that its “evident purpose” was to restrain trade. In order to do so, it was required “to marshal abundant testimony from competitors that the consolidation had engaged in unfair, restrictive, or discriminatory acts that were meant to abridge the freedom of others to go about their business in the normal manner or engage in the trade of their choosing” (Lamoreaux, 1988, pp. 191–192). As a result of this doctrine, tight combinations retained some options such as controlling a resource through vertical integration. More importantly, because competitors’ testimony were crucial to prove the “evident purpose” of a restraint of trade in a tight combination case, most of the times competitors did not have incentives to provide such a testimony. Because, as we have shown, the form of competition of the period was characterized by vertically integrated lead firms setting relatively high prices, non-lead firms profited from the high prices lead firms could set by recurring, among other things, to tight combinations. Therefore, non-lead firms had no incentives to testify against lead-firms (Lamoreaux, 1988). Consequently, “Supreme Court decisions in this era affecting collusion and cooperation between firms reflected tolerant treatment”; the era also

¹⁷ *Standard Oil Co. of New Jersey v. United States*, 221 US 1 (1911) p. 54

“marks the longest lapse for the enforcement of antitrust controls on dominant firm behavior” (Giocoli, 2015).

The soft enforcement of antitrust during this period was certainly made possible by the switch from the literalist jurisprudence to the rule of reason jurisprudence, but the active factors that explain the loosening of antitrust enforcement are to be found in the historical context of the country at the time. Under other historical circumstances, the rule of reason could have been as well used as a weapon to practice a harsher yet more sophisticated antitrust. Two major historical events have to be recalled to understand the way in which the rule of reason was applied until the mid-1930s: World War I and the Great Depression. In 1917, the Federal Government set in place the War Industries Board (WIB), an agency in charge of purchasing war supplies in preparation for United States’ involvement in World War I. This agency encouraged mass production, set production quotas and allocated raw materials. The WIB was a success: between 1917 and 1919 (last year of its existence), industrial production rose by 20 percent. This experience legitimized an ‘associationalist’ vision of business-government relations (Giocoli, 2015) and improved public (and judges’) opinion of large corporations and trusts, which, by recurring to collaboration practices considerably distant from what a strict antitrust approach would have prescribed, had been the industrial engine of war. A decade later, “to many observers the 1929 crash repudiated the competitive model of economic organization and verified the associationalist preference that the government take stronger steps to orchestrate commerce” (Kovacic & Shapiro, 2000, pp. 46–47). Following this spirit, in 1933 the federal government passed the National Industrial Recovery Act (NIRA) in order to spur recovery and fight deflation (cf. Figures 6 and 7) in the midst of what had been the worst economic crisis of the history of the country. Among other measures, the NIRA legalized cartels and other forms of price-fixing and cooperation between competitors (Eisner, 2000). In Fligstein words, “the NIRA was the embodiment of the cartelized approach. The firms in each industry organized with the blessing of the NRA” (Fligstein, 1993, p. 122).

By the mid-1930s, the NIRA experiment was unanimously considered a failure and in 1935 the Supreme Court judged that it was unconstitutional and put an end to it. Moreover, the luster of the associationalist view had faded after the growth in size and market power of major corporations had not proven to be a cure to the recession. This led to a change of mentality from the federal government, the public opinion and the judges that had to decide on antitrust cases. President Franklin Roosevelt started to turn to advisors defending the idea that competition was the only way to economic recovery (Leuchtenburg, 1963). From 1936 to 1940, he appointed several officials to the Justice Department that “mounted ambitious attacks on horizontal collusion and single-firm dominance” (Kovacic & Shapiro, 2000). At the same time, the 1936 Robinson-Patman Act was passed. This act, which prohibited for the first time price

discrimination, was designed to protect small stores from chain stores that would buy cheaper than them. This act was another signal of the renewed anti-large corporations and pro-antitrust spirit that started to spread in the mid-1930s. On the courts' side, the same spirit led to a shift towards a considerably more rigid application of the rule of reason. Through several cases, enforcement against price-fixing and market allocation cartels as well as condemnations of dominant firms' behaviors increased (Kovacic & Shapiro, 2000). Nevertheless, it would take a few more years for antitrust to attack what had been the major market power devices of the constricted competition era: intellectual property rights and vertical and horizontal integration.

Another important consequence of the impact the Great Depression had on the forging of the Fordist form of competition (1945-1970s) that started in during the constricted form competition period was the separation between commercial and investment banking. In 1932, the Senate led the Pecora Investigation to investigate the causes of the 1929 stock market crash. The investigation pointed out several abusive practices of the financial sector, which led to the passing of the Banking Act a year later, also known as the Glass-Steagall Act. This act forbade investment banks and securities firms from taking deposits. Symmetrically, it prevented commercial Federal Reserve banks from:

- dealing in non-governmental securities for customers
- investing in non-investment grade securities for themselves
- underwriting or distributing non-governmental securities
- affiliating (or sharing employees) with companies involved in such activities

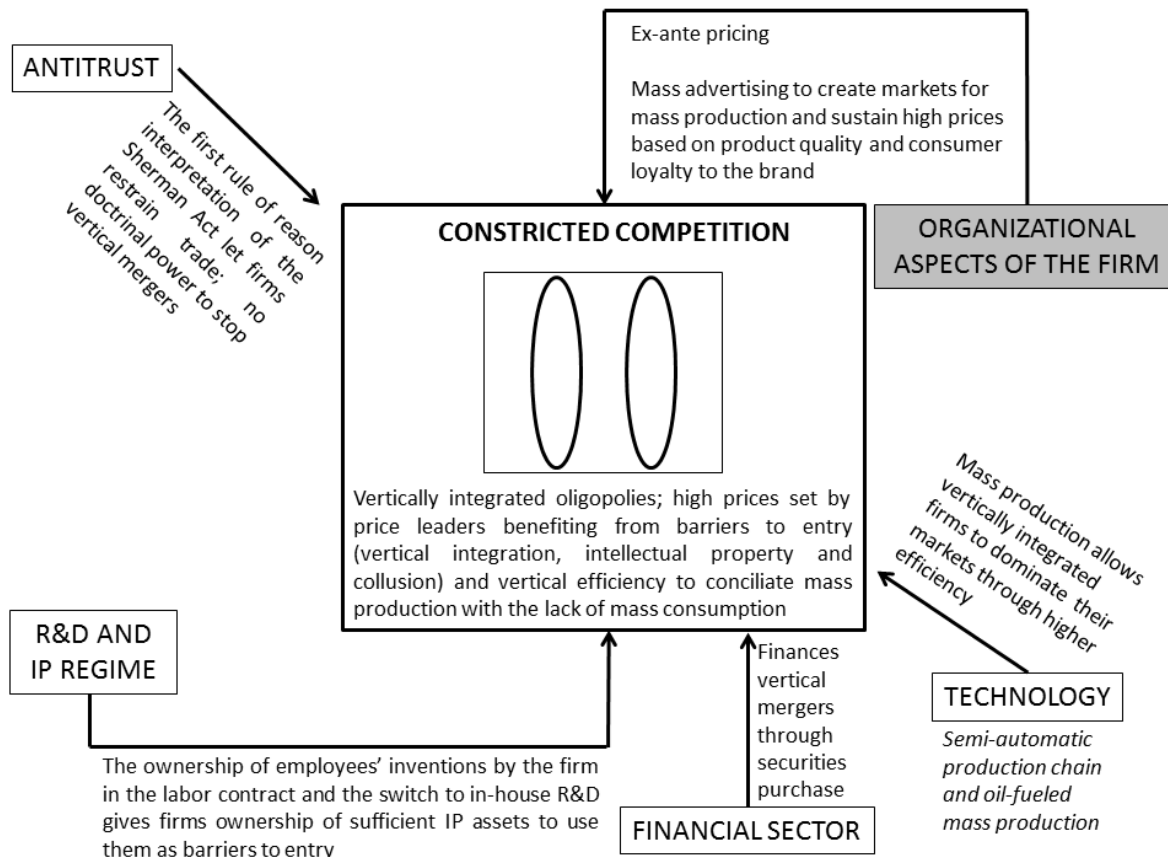
This separation between commercial and investment activities in the financial industry would assure that the financial sector would mainly play the role of financing the expansion and consolidation of non-financial firms until the beginning of the Fordist form of competition (1945-1970s).

To conclude, the constricted form of competition implied a redefinition of the purpose of and the forms taken by market power. During the collusive competition phase, market power had been primarily used to coordinate competition and avoid predatory pricing through collusion and, later on, horizontal mergers. During the constricted competition era market power started to be used not to coordinate but to *constrict* competition. The collusive competition strategy had failed because, given the industrial organization and legal landscape of the time, without barriers to entry ruinous competition was inevitable. During the constricted competition era, firms were successful in remedying that mistake by raising barriers to entry through the use of intellectual property and vertical integration. But not only did the forms taken by market power during that era change; so did the role it played regarding competition.

Instead of using market power to coordinate competition, firms started to use it to shelter themselves from competition following a strategy based on dominant vertically integrated firms using low-cost mass production techniques and setting high prices that were sustainable because their market power sheltered them from new entrants and discouraged defiance by incumbent competitors. Unlike its predecessor, this form of competition was successful in resisting deflation¹⁸ and restoring profitability. The period spanning from 1920 to 1950 represents an upward shift in the long-term trend of the rate of profit in the United States (cf. Figure 8). Victim of its success, this form of competition would generate the seeds of its destruction. The animosity against large corporations and monopolization that started to revive in the mid-1930s would lead to a radical transformation in antitrust legislation and enforcement that, together with other crucial evolutions of the organizational structure of the firm and, more broadly, of the American regulatory regime, would configure a new form of competition: the Fordist form of competition.

¹⁸ Although the period in question presents a downward tendency in prices (cf. Figure 6), one has to bear in mind that it starts after the strong inflation of the World War I period, during which prices rose by 88% in 6 years. A rebound deflation was therefore inevitable. Moreover, the constricted competition period has also been shaken by the Great Depression and its subsequent profound deflation. Nonetheless (and this shows to which extent market power was playing a countervailing role in prices dynamics during a severely deflationary period), between 1920 (the peak of the World War I inflation period) and 1939 prices were on average 59% higher than before their pre-World-War-I inflation level, which in turn had been the highest in 41 years (!).

Diagram 3: The constricted form of competition (circa 1920s to 1945)



NB: The dominant institution of the form of competition is shaded. Arrows from other institutions indicate the key direct and indirect institutional complementarities with the dominant institution.

4 Fordist Competition (circa 1945 to 1970s)

The origins of the Fordist form of competition are to be found in the Great Depression. It was after this event that two major transformations that would redefine the functioning of competition and the nature of its link to market power took place: the birth of the diversified M firm and a profound strengthening of antitrust enforcement and legislation. Together, and complemented with the institutional designs of the intellectual property regime and the financial sector in a technological context favorable to mass production, they would shape a new form of competition. In this new form of competition market power would be severely curtailed by antitrust and firms would be therefore exposed to strong competition in mass consumption markets. In order to compete, they would have to constantly innovate to raise

productivity and introduce new products. But only after WWII would those changes have matured and the broader regulation mode known as Fordism would have been deployed for this new form of competition to be able to unfold.

During the 1920s, pioneer firms started to develop a new competitive strategy that, unlike the dominant one at the time, was not based on controlling the prices of a market through efficient production and barriers to entry arising from vertical integration and intellectual property assets. In the midst of the marketing revolution that had multiplied advertisement expenditure in the 1920s, these firms started implementing a business strategy in which “the emphasis was on producing brand loyalty, expanding market share, and finding new markets for existing and new products, rather than on direct price competition (...) Firms no longer produced a narrow line of products, but began to produce full lines that spanned entire industries. Organizational fields were no longer systems of power oriented toward controlling price and production levels. Instead, they were places to observe what competitors were doing in order to avoid direct competition and find new opportunities to increase sales” (Fligstein, 1993, p. 123).

The diversification and product differentiation strategy proper to this competitive strategy required a complementary organizational innovation that came along at the same time: the M firm. By the 1920s, the unitary and functional forms of organization of the corporation were hegemonic in the United States: “modern business enterprise had reached its maturity” (Chandler, 2002). This form, perfected by General Electric and Du Pont before World War I, had been used “primarily by companies producing a single line of goods for one major product or regional market” (Chandler, 2002), as it had been widely the case before the 1920s. At this period, General Motors and Du Pont pioneered in developing a new way of organizing the firm into a multidivisional, decentralized structure in which every division was in charge of a market and top managers were exclusively taking care of strategic decisions instead of day-to-day business, which was one of the weaknesses of the previous structures. Functional departments (e.g. sales, production) were not monolithic anymore but spread around divisions that formed a largely autonomous organization within the organization and centered on a product line or a regional market. This new form of organization is the one that best fit firms “manufacturing several lines for a number of product and regional markets” (Chandler, 2002). Indeed, it gives the firm a larger strategic flexibility that allows an easier penetration of new markets or the diversification into new types of products, while it favors the coordination of different stages of production and the integration between production and sales within each division, as well as the exploitation of economies of scale and variety (Weinstein, 2010). As Fligstein (1993, p. 159) sums it up, “in order to coordinate the production of multiple products, the multidivisional form was invented”. Although diversification, and the subsequent adoption of the M firm

organizational model, started in the 1920s, it multiplied after the Great Depression. Using data from firms with more than \$5,000 of production, Fligstein shows that among firms that were producing different product lines, the percentage producing related products (e.g. an instruments companies that produces guitars and pianos) passed from 25.3% in 1919 to 42.3% in 1937 (Fligstein, 1993). In another study that compares firms' membership in the 100 largest firm category and their strategy in terms of product line diversification (Fligstein, 1991) he finds that during the 1920s the firms that entered the top 100 did so by using a product-related diversification strategy and, during the 1930s, this strategy made them grow. The final shift occurred in the 1940s, when many of the firms that remained in the top 100 started to adopt the product-related diversification strategy of the newcomers.

Moreover, the World War II context contributed to catalyze the spread of this second “managerial revolution” to many sectors of the economy for two reasons (Chandler, 2002). First, the war required the production of new technologically complex products, a task that was better coordinated through a divisional form of organization of the firm and required accelerating the ongoing transformation of the role of management from mere “monitoring of current production and distribution of goods” to the “allocation of resources for future production and distribution” (Chandler, 2002). Second, the requirements of mobilizing the economy to prepare for war led to the pooling and expansion of the managerial procedures and controls that were until then confined to large firms. By the end of World War II, the diversified firm was the dominant model among the largest American firms. Using three different long-run datasets on products mix of the 100 largest firms, Fligstein concludes that “the 100 largest firms at the end of the [1950s] decade were either becoming diversified or already diversified. This is evidence that in order to remain in the population of the largest firms, one needed to be diversified” (Fligstein, 1993, p. 263). This tendency accelerated in the 1950s. Analyzing the 200 largest firms, Gort (1962) finds that the rate of introduction of new products jumps from 39.5% in the 1939-1950 period to 86.5% in the 1950-1954 period. Moreover, he finds a continuous decline in the percentage of those new products that are introduced in the main industry¹⁹ of the firm between 1929-1939 and 1950-1954.

In brief, the diversification strategy started in the 1920s with some pioneer firms, spread after the Great Depression during the 1930s and at the end of the 1950s it had become the hegemonic strategy of the leading firms of the American economy. This strategy spread during the Great Depression because it offered firms the possibility to cover from risk in a very uncertain context by spreading it across different product lines and it gave them the possibility of raising the utilization of the plant capacity, two reasons quoted by the executives of 26 of the 50 largest firms interviewed in 1937 by Thorp and Crowder in their

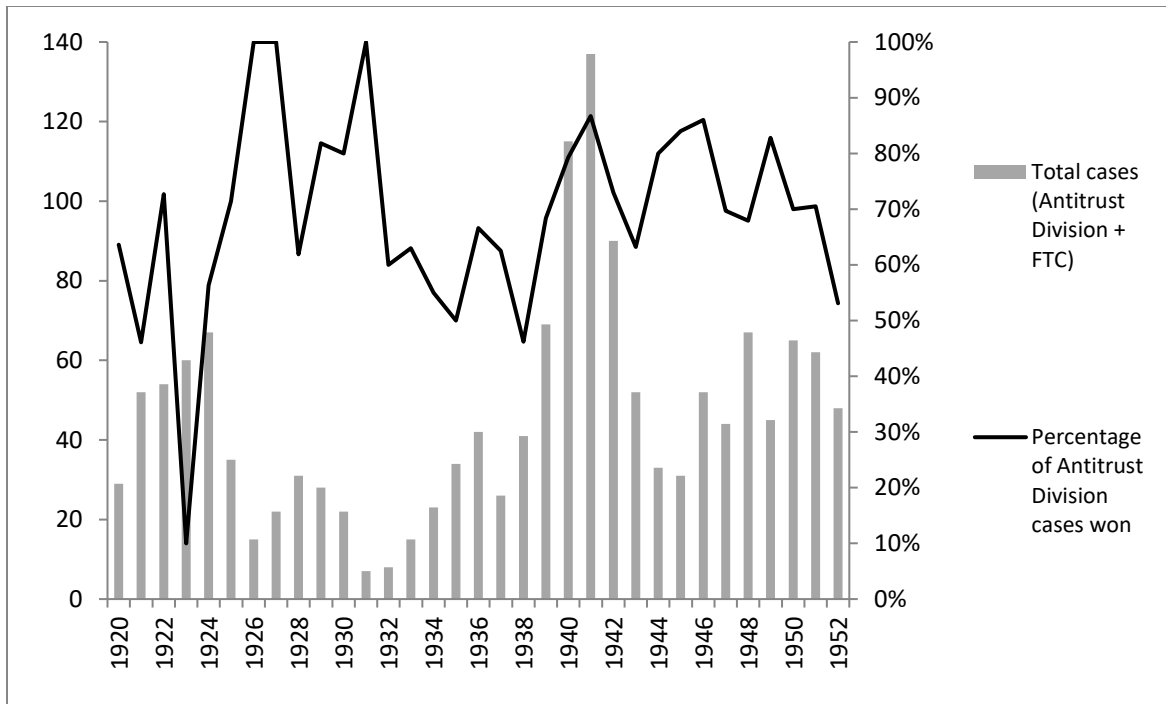
¹⁹ The main industry refers to two-digit SIC scores.

research on diversification (Thorp & Crowder, 1941). In Fligstein (1993) words, “the environmental shock that pushed diversification from a tactic employed by a small number of firms to the central tactic used by almost all of the largest firms was the Depression”. Nonetheless, in order to understand why this strategy that suited well times of economic crises spread during the next decades until it became dominant, other factors need to be taken into account. From a long-term term perspective, the expansion of in-house R&D, which had become usual among the largest firms since the 1920s, offers a part of the explanation. In-house research labs were now providing firms with increasing product innovations, which opened up opportunities to diversify. This is another of the reasons for adopting diversification strategies pointed out by executives in Thorp and Crowder’s study.

But the fundamental reasons of the endurance of the Great-Depression-suited diversified M firm during the “golden age of capitalism” are to be found in the collapse of the pillars of the constricted form of competition. As shown in the previous section, the latter was based on vertically integrated unitary firms that dominated non-mass-consumption markets and could set high prices because of the barriers to entry that their market power (which came from their size, vertical integration, their use of intellectual property as barriers to entry and their horizontal and vertical anti-competitive practices) allowed them to create and maintain. Beginning around World War II, the expansion and deepening of antitrust legislation and enforcement, as well as the setup of a new regulation mode based on salaried workers and mass consumption, dismantled the old form of competition and left fertile soil for a new one in which the diversified M firm would reign. Once the possibility of exerting market power disappeared, the only way left for firms to survive competition was to raise productivity and to introduce new products. What had been the survival strategy of a few pioneer firms during the Great Depression had become a standard competitive practice in the Fordist form of competition.

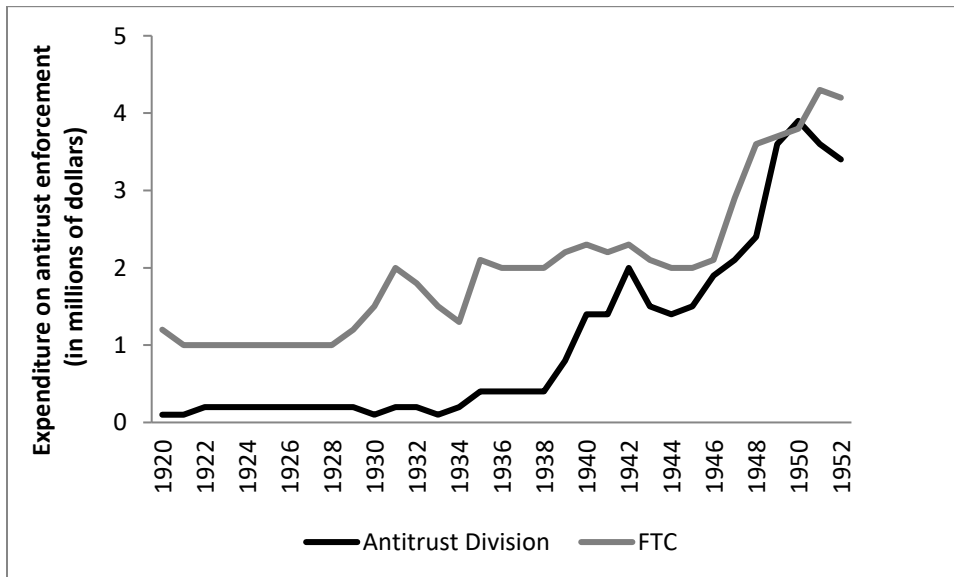
As explained in the previous section, the mid-1930s were a turning point in terms of antitrust. The Roosevelt administration, not without the support of the general public, decided to go after the large firms, which were perceived as having accumulated too much market power without that resulting in economic recovery. But it was not until the late 1940s that significant changes in antitrust legislation and enforcement started to take place. Figures 9 and 10 offer a good picture of the shift in antitrust enforcement.

Figure 9: Total antitrust cases (left axis) and percentage of Antitrust Division cases won (right axis) in the proceUnited States (1920-1952)



Source: own elaboration based on Fligstein's (1993) data.

Figure 10: Expenditure on antitrust enforcement in the United States (1920-1952)



Source: own elaboration based on Fligstein's (1993) data.

As Figure 9 shows, 1939 was the turning point in terms of antitrust enforcement measured in number of cases issued. After that year, the activity of the Antitrust Division of the Department of Justice and the Federal Trade Commission (FTC) increased significantly: while the average number of antitrust cases issued per year in the 1920-1930 decades was 13.3, during the 1940-1950s decades this number rose to 31.3. As soon as 1948, half of the 100 largest American firms had been sued by the Antitrust Division (Christophers, 2016). Moreover, while activity picked up, the effectivity in terms of percentage of cases won by the Antitrust Division also increased: it went from an average of 66% during the 1920-1930 period to 71% during the 1940-1950s decades. The rise in antitrust enforcement is consistent with the increase in the expenditure dedicated to it. As seen in Figure 10, the rate of growth of antitrust expenditures shifted upwards drastically in 1946 for the Antitrust Division and in 1947 for the FTC. Indeed, in the seven years after the end of World War II, total antitrust expenditure more than doubled, passing from 3.5 million in 1945 to 7.6 million in 1952.

The shift in antitrust was not only in terms of enforcement. Antitrust jurisprudence started to evolve to become more and more stringent and to continuously erode firms' possibility of exerting market power. Regarding vertical market power exerted through contractual means, as Hovenkamp (2014) explains, "beginning with former Assistant Attorney General Thurman Arnold in the late 1930s, U.S. antitrust policy dramatically shifted from tolerance to a drastic attack on both ownership vertical control via the law of monopolization and mergers, and contractual vertical control via tying, exclusive dealing, and resale price maintenance. By the late 1930s and 1940s, vertical integration was widely perceived as almost inherently monopolistic".

Some landmark cases set precedent to forbid practices that had been common during the constricted form of competition. For example, the 1947 *International Salt Co. v. United States* case is one of the landmark cases in terms of horizontal restraints jurisprudence. The defendant had patented machines that facilitated salt processing, mixing and injection and required those who used the machines to also buy the salt processed with the machines. The ruling was against the defendant on the basis that tied sales were a *per se* violation of the Sherman Act. This ruling set a precedent and removed tied selling from firms' market-power-building strategies menu. Another example, this time regarding vertical restraints, is the 1967 *United States v. Arnold, Schwinn & Co.* in which the Supreme Court judged that territorial restrictions on resale imposed by a manufacturer to a distributor are *per se* violations of the Sherman Act (Hartley, 1999). **The common pattern in the evolution of antitrust jurisprudence on restraints of trade is the subsequent fading off of the rule of reason in favor of stricter *per se* rules. This rendered antitrust stricter because, by setting precedents against defendants based on *per se* rules, antitrust started to**

forbid practices regardless of the circumstances, the possible positive effects in terms of efficiency (Encaoua & Guesnerie, 2006) and the interpretations made by the judges, who otherwise might have used the rule of reason to lighten antitrust enforcement, as we have seen it had been the case in the past.

Another major evolution of antitrust jurisprudence that contributed significantly to curtail firms' capacity of exerting both horizontal and vertical market power was the consistent hostility towards intellectual property from antitrust that started in the 1940s (Christophers, 2016; Fisher, 1999; Sell, 2004, Waller & Byrne, 1993).

A landmark case regarding antitrust and patents is the 1948 *United States v. Line Material Co.* This case has to be read in light of the ruling of the 1926 *United States v. General Electric Co.* case. General Electric held three patents needed to produce electric lights with tungsten filaments as well as a market share of 69% on lightbulbs. It decided to grant a license to its competitor Westinghouse (which held a 16% market share) on the condition that the latter would sell the lightbulbs at a price fixed by General Electric, which could change at discretion. This practice was suspected of constituting a price-fixing agreement masked in intellectual property licensing, but the Supreme Court judged it lawful. Consistent with the features of the constricted form of competition described in the previous section, the decision reflected the antitrust immunity intellectual property benefited from at the time. The ruling of the case states that the patentee has the right to impose any conditions (including price) when licensing to a manufacturer that “are normally and reasonably adapted to secure pecuniary reward for the patentee’s monopoly”²⁰. In *Line Material*, several manufacturers of electrical devices formed a patent pool to obtain licenses over two patents from the firms Lemmon and Shultz, which ‘blocked’ each other but, combined, resulted in a superior device. The licensing agreements contained price-fixing clauses, which is why the Supreme Court considered it a violation of the Sherman Act. This case represented a watershed in antitrust jurisprudence regarding patent pools and other uses of patent licenses that might restrain trade, ending so with the doctrine set in *General Electric*. From *Line Material* on, antitrust would be hard on any use of patent licensing that might restrain trade in any way. This policy crystallized in the list of licensing practices considered to represent restraints of trade that the Antitrust Division issued in 1975, but that had been already announced in 1970 by Bruce B. Wilson, Deputy Assistant Attorney General before the Fourth New England Antitrust Conference. The list, which came to be known as the ‘Nine No-Nos’, included the following practices (Lim, 2013):

²⁰ *United States v. Line Material Co.*, 333 U.S. 287 (1948) Available at: <https://supreme.justia.com/cases/federal/us/333/287/case.html>

- (1) Tying the purchase of unpatented materials as a condition of the license
- (2) Requiring the licensee to assign back subsequent patents
- (3) Restricting the right of the purchaser of the product in the resale of the product
- (4) Restricting the licensee's ability to deal in products outside the scope of the patent
- (5) A licensor's agreement not to grant further licenses
- (6) Mandatory package licenses
- (7) Royalty provisions not reasonably related to the licensee's sales
- (8) Restrictions on a licensee's use of a product made by a patented process
- (9) Minimum resale price provisions for the licensed products

Moreover, besides the strong limits set to intellectual property through antitrust, it was common that the state would impose compulsory licensing to companies (Fisher, 1999), although many times compulsory licensing was the result of an antitrust-related court ruling.

Patents were not the only intellectual property assets which use started to be curtailed by antitrust. Before 1949 there had not been a single antitrust case involving trademarks. At the beginning of that year, the Antitrust Division launched a series of cases in which the use of trademark was considered to be “a primary and direct source of antitrust violation” (Timberg, 1949), setting jurisprudence that would impose severe antitrust restrictions to the use of trademark as tools to restrain trade in the same way that was happening with patents.

Another main feature of the harshening of antitrust, and perhaps the most influential one, was the tight merger control that began in 1950 with the Celler-Kefauver Act. Its origins go back to the mid-1930s, when, as we have shown above, antitrust started to regain power. During that period, economists started to take a lead role in antitrust, a discipline that until then had been solely exerted by jurists. By the 1950s-1960s economic-model-based antitrust had become the norm (Carstensen, 1988). The importance of the role economists started to play to understand the Fordist form of competition lies in the fact that it was a particular economic school, the Structuralist School, which came to dominate antitrust thinking between 1936 and 1972 (Kovacic & Shapiro, 2000). This school of thought considered firms’ behaviors to depend on the industry’s structure, and mainly on its concentration level. The Structuralist School had a strong influence on jurisprudence first and antitrust legislation afterwards. In *US v. Alcoa* (1945) and *US v. American Tobacco* (1946), two cases that made it to the Supreme Court, the government’s cases were for the first time not based on alleged conspiracies, but on concentration and size within the industry. For the first time the Court started accepting statistical arguments on concentration and size as evidence in

antitrust cases (Fligstein, 1993). This reasoning would become increasingly frequent and would materialize soon in the 1950 Celler-Kefauver Act.

In the late 1940s, two issues that worried the general public were mobilized by the FTC, the Congress and the Department of Justice in their campaign against big companies: inflation and the fear of communism. Inflation, they claimed, was the consequence of the economy being dominated by a few large corporations with market power that were avoiding competitive pricing. The size of the few companies dominating the economy, in turn, was seen as a prelude to collectivism (Fligstein, 1993). In both arguments was implicit the Structuralist idea according to which size equals power. These arguments added to the increasing animosity against large companies that had started in the mid-1930s and contributed to pass in 1950 the Celler-Kefauver Act, which set strong legal barriers to horizontal and vertical mergers. This act declared illegal any merger or joint venture (be it horizontal or vertical) that would lessen competition or create a monopoly (Fligstein, 1993). Moreover, it closed the legal loophole of the Clayton Act. The latter forbade companies to buy their competitors' securities, but not their assets. With the Celler-Kefauver Act, the buying of competitors' assets started to be controlled as well. Additionally, the act clarified that the Clayton Act applied not only to horizontal mergers but also to vertical mergers (Christophers, 2016). Armed with the Celler-Kefauver Act, and supported by the Structuralist economic theory, the Antitrust Division of the Department of Justice and the FTC imposed a severe control of both horizontal and vertical mergers during the 1940s, 1950s, and 1960s (Christophers, 2016; Encaoua & Guesnerie, 2006; Fligstein, 1991; Kovacic & Shapiro, 2000), probably the most severe it has ever existed. As Fox and Pitofsky (1997) put it, "in the 1960s the United States had by far the most stringent antitrust merger policy in the world, striking down mergers among small firms in unconcentrated markets. It was not unusual for the government to challenge successfully mergers among direct competitors holding no more than 5 or 6 percent of the market". The stringent Structuralist approach to Antitrust regarding mergers crystallized in the influential Department of Justice's merger guidelines of 1968, in which it was made clear that concentration was the measure of market power and that the former would almost univocally lead to the obtaining and exertion of the latter (Christophers, 2016). Efficiency gains were considered to be minor positive effects in comparison to the harmfulness of increases in market power generated by concentration. An illustration of the spirit of merger policy during the Fordist competition era is the merger guideline's view on vertical integration: "integration accomplished by a large vertical merger will usually raise entry barriers or disadvantage competitors to an extent not accounted for by, and wholly disproportionate to, such economies as may result from the merger"²¹.

²¹ Quoted by Hovenkamp (2014).

The strictness of the merger policy of the period under analysis is one of the factors that have contributed to the third merger wave of the United States, which took place during the 1960s²² and was characterized by being majorly driven by conglomerate mergers (Fligstein, 1993; Weinstein, 2010). As a result of this trend, by 1980 the median large American corporation operated in three different industries (Davis, Diekmann, & Tinsley, 1994). Faced to the fact that antitrust was very strict on firms that would become too big in their industries and it was blocking both horizontal and vertical mergers, the only option for growth left to firms was the conglomerate. This, in turn, was in line with the trend towards diversification of the firm that, as we have seen above, started in the 1920s and matured during the Fordist competition era. Finally, the good economic environment and the low interest rates were other factors contributing to the conglomerate merger wave of the 1960s. The merger wave started with small firms that were under the radar of the FTC and the Department of Justice, but once the conglomerate strategy for growth they were carrying on became apparent, large firms started to implement it as well (Fligstein, 1993). And because conglomerates group by definition firms in different industries, the Structuralist approach to market power based on concentration in a same relevant market or on the leverage that vertical integration offers did not apply. Hence, antitrust authorities could not oppose these mergers. **The result of this process was the definition of an industrial organization landscape that characterized the Fordist form of competition: conglomerates of vertically integrated firms.**

Therefore, during the Fordist competition era, vertically integrated firms grouped in conglomerates were competing under strict supervision of antitrust authorities, which blocked any abuse of market power related to size, vertical integration or intellectual property. **During the constricted competition era, market power had given firms the possibility to set high prices that (more than) compensated the lack of mass markets needed to absorb their mass production. During the Fordist competition era, the harshness of antitrust and the development of mass markets altered competitive dynamics: lead firms no longer used market power to become price-setters; firms started competing on price and through the introduction of new products in mass markets *because they could not exert market power* and mass markets allowed them to make profits over large quantities of standardized products instead of on large margins.**

Let us point out that although firms competed on price this does not mean that prices constantly fluctuated as a result of price wars, as it was the case notably during the Predatory Competition era (1840s-1860s).

²² Fligstein (1993) considers a wider range of years for the third merger wave (1954-1969).

On the contrary, firms set prices according to an ex-ante cost-plus logic²³. To set a price, they would add a mark-up over costs that would remain steady in spite of short-term fluctuations in demand or costs (Boyer & Mistral, 1983). This short-term-steady level of mark-up depended on competition and wages. Price competition took place in the long-run through price cuts, as productivity increases translated in lower normal costs and antitrust authorities made sure prices were not abusive.

The development of mass markets was therefore a social process that created institutional complementarities that co-built the Fordist competition regime. Two major channels of creation of mass markets can be identified. First, the broadest change of the regulation mode after World War II (the war effort itself being a government stimulus that resulted in full employment at the beginning of the period, as Chandler (2002) recalls) that has been studied in depth by the Regulation School. After 1945, the state started, on the one hand, to develop social welfare, which allowed individuals to have minimum living standard conditions guaranteed by the state and, so, to use their salary to foster demand in mass markets, or even to consume when they were not wage earners (Coriat, 1979). On the other hand, the State would guarantee full employment through Keynesian economic policy and through a set of regulations that would result in setting the employment relationship as a universal status that would provide high salaries (for example, by fixing minimal wages) (Lipietz, 1983). Moreover, the regulation of the wage-labor nexus, which became hierarchical over the other institutional forms during the period, gave workers a strong bargaining position, which allowed them to negotiate high salaries that would increase with productivity, enabling so the emergence of mass markets (Aglietta, 1997; Boyer & Saillard, 1995).

Another important transformation that came from the firm and allowed for the creation of mass markets was the policy of setting high salaries subject to productivity and working process conditions. Ford's famous 'five dollars a day' policy is the emblem of this logic that would become popular during the Fordist form of competition. One of the outcomes of this policy was that it allowed for the commoditization of workers' consumption: with high salaries, workers stopped recurring to domestic agriculture in parallel of their jobs. But although this was a major outcome of the "five dollars a day" policy, its application followed the logic of the transformation of the firm towards a greater control over the working process that we have been tracing. Indeed, this salary was subject to respecting some existence conditions (hygiene, moral, alcohol and tobacco consumption, etc.). This had an effect of breaking worker's rebelliousness and high turnover, which was due to the unhygienic and violent working conditions that prevailed at the time. Finally, the 'five dollars a day' salary was also subject to respecting

²³ This pricing mechanism will be thoroughly explained in Chapter 2.

the pace of the assembly line, which had taken workers' control over the speed of the production process (Coriat, 1979).

In addition to the existence of a mass market, strong long-run price competition between vertically integrated diversified firms grouped in conglomerates was possible because of the particular configurations of the financial sector and the intellectual property regime that prevailed during the Fordist competition era. Regarding the financial sector, the Fordist competition regime corresponds to the financial regime that Minsky (1990, 1992) has defined as “managerial capitalism” (1933-1982). During this era, the financial sector was dominated by investment banks dedicated to financing the growth and stability of corporations through long-term lines of credit. Internal financing by the corporation was also common during this period. Although the financial sector also financed the third merger wave, it is important to point out the qualitative difference that bears with the role it had played in financing mergers in the past. The first merger wave was a rationalization merger wave. Banks were financing it in the hope that consolidation would allow firms to raise prices and stop ruinous competition. During the second merger wave, banks were also financing mostly vertical mergers in order to consolidate a market-power-building strategy that would allow firms to raise prices and increase earnings for banks that owned their stocks. But during the third merger wave, banks financed conglomerate mergers in order to expand the growth of the corporation once antitrust blocked any other form of expansion, not to obtain market power and increase profits by exerting it.

We want to stress the complementarity of the role of finance and the form of competition during Fordism: in a scenario of strong competition on prices and limited possibilities of market power exertion, banks played the role of financing the long-term investments needed to improve productivity, fund the development of research and development leading to the introduction of new products and expand diagonally through conglomerates. Productivity gains and introducing new products were the only way for firms to increase profits in domestic markets dominated by strong long-run price competition between vertically integrated firms deprived of market power that earned money on quantities and not on mark-up. ‘Collecting’ performing firms in those industries through conglomerate acquisitions, in turn, was the best way for financial institutions to build a healthy financial portfolio in what was a highly regulated financial market. Indeed, the Glass-Steagall Act forced commercial banks to center their activity on making loans. Short-run financial profits were not an option for them and, therefore, firms could count on commercial banks to finance long-term investment in R&D and expansion.

The institutional complementarities of the Fordist form of competition also extend to the intellectual property regime. During this period, the regulation of intellectual property was configured around the “open science regime”, which relied on two basic pillars (Coriat & Weinstein, 2011; Orsi & Coriat, 2006). The first one is the clear distinction between inventions and discoveries, the latter being the only valid subjects of patenting. Inventions correspond to basic science, while discoveries refer to industrial applications²⁴ of intellectual findings. The counterpart of the temporary monopoly the patent represents is the divulgation of the discovery. Discoveries were therefore confined to technology. The second pillar is the clear and consequent division between the agents in charge of each type of intellectual creation. Scientific research (i.e. research aimed at producing basic science) took place mainly in public nonprofit organizations whose objective was the production of freely-circulating knowledge such as universities, publicly-funded research labs or government agencies. Technological research, in turn, took place within the corporation. As we have seen above, in-house research started spreading in the 1920s. By World War II it had become the norm in large American firms. The production of technological knowledge was therefore part of firms’ routines. The underlying basic knowledge was open and firms used it to build technological applications over it and obtain patents.

We want to stress this time the complementarities of the open science regime and the competitive dynamics proper to Fordism. On the one hand, the patent system, which implies a temporary monopoly over a technology, gave firms incentives to invest in technologies that would raise their productivity and help them creating or conquering new markets by introducing new products. These were the only possible competitive strategies to increase profits in a form of competition dominated by strong price competition and curbed market power. Moreover, antitrust authorities made sure that the legal monopolies granted by patents would not result in market power exertion, as the frequency of compulsory licensing and the harshness of the DOJ and the FTC on intellectual-property-related cases during the period reflects. On the other hand, the strict distinction between patentable discoveries and non-patentable inventions assured that no firm could obtain market power by blocking other firms’ discoveries through the holding of a patent over an invention on which they would rely. Inventions were preserved by the intellectual property regime as “common knowledge bases” (Arrow, 1962) that would give firms the opportunity to compete through technological *discoveries*.

²⁴ In the United States (as in Anglo-Saxon law in general) this distinction took the form of the “utility” doctrine: a discovery could only be patented if the “practical or commercial utility” of the invention was proven, which excluded by definition scientific inventions (Eisenberg, 1987; Orsi & Coriat, 2006).

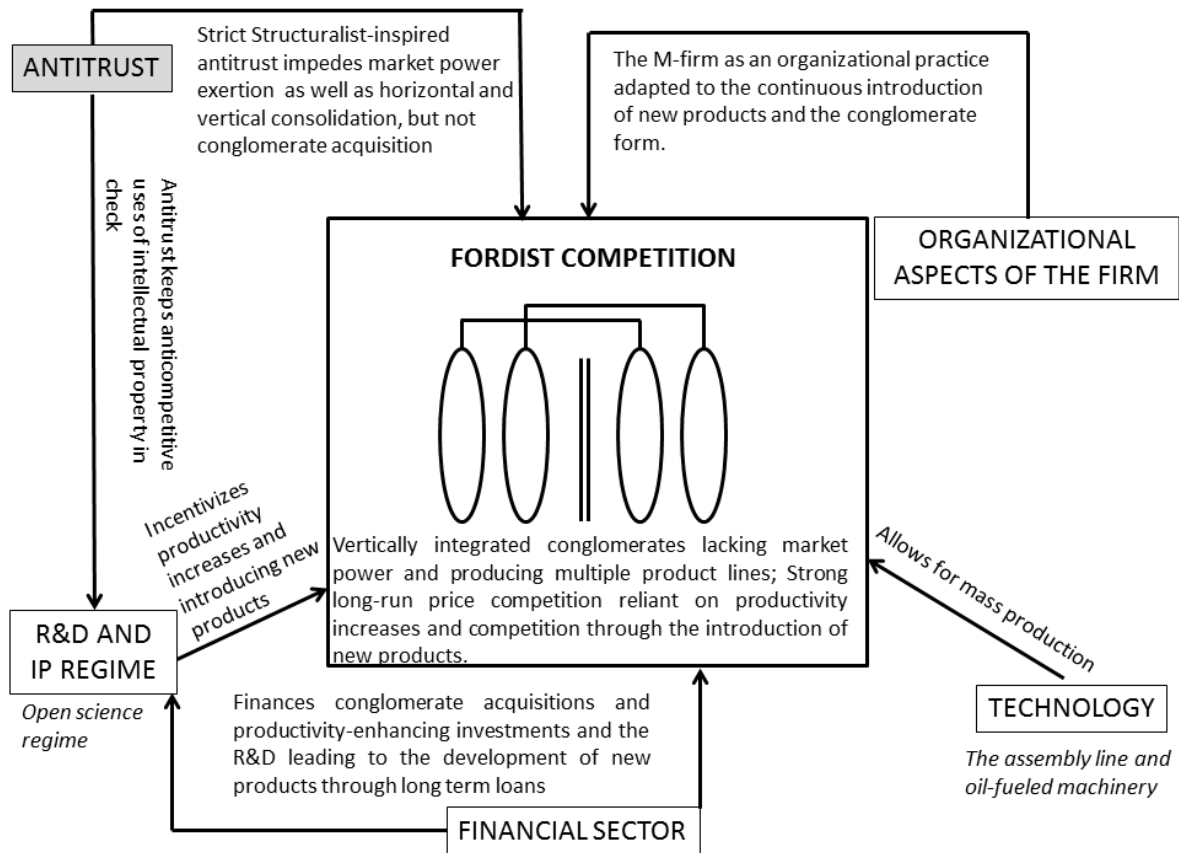
In conclusion, the Fordist form of competition was a regime in which market power was caged by antitrust authorities and the open science regime. This, coupled with the evolution of the firm towards a Fordist mass production model managed through a divisional organizational structure, resulted in a form of competition characterized by strong price competition in which vertically integrated firms competed over conquering mass consumption markets through the introduction of new products and productivity increases. These were financed by internal means and through investment banks' long-term lines of credit.

Given the strict watch over market power exertion that reigned at the time, as well as the strong competition that existed largely as a result²⁵, productivity increases would translate into price cuts. Moreover, because of the hierarchical role played by the wage-labor nexus, they would also translate into wage increases. This, added to the intensified foreign competition that developed during Fordism as other countries caught-up in terms of productivity and international trade liberalized and expanded (cf. Figure 4), set the bar high for productivity increases to translate into increasing (or at least stable) profits, and eventually starting driving the latter down in the 1960s, when productivity increases could not keep up anymore (Christophers, 2016; Glyn et al., 1988; Jilberto, Lipietz, Ominami, & Amin, 1987). As Figure 8 shows, the 1950-1980 period corresponds to a long-term declining phase of the profit rate in the United States.

As we will see in the next section, this profitability crisis would be solved (again) through a complete reconfiguration of the hegemonic form of competition in which market power would once again take the center stage. Nevertheless, this would not imply a return to the constricted form of competition. On the contrary, in the finance-led form of competition that came to replace the Fordist one, market power would take a new form and purpose that would redefine the way it relates to competition. Like during the collusive form of competition, and unlike during the constricted form of competition, in the finance-led form of competition market power would play the role of *coordinating* competition. Nevertheless, unlike the collusive form of competition, coordination would be vertical and would penetrate the production process. Moreover, like in the constricted form of competition, market power would serve as a mean to extract profits in detriment of other firms, although it would not imply the annulling of competition but, quite the contrary, its *enhancement*. We shall expose the transformations that crafted this historically unique relation between competition and market power in the next section.

²⁵ In an empirical study that uses both structural variables (market shares, concentration ratios, presence of barriers to entry, etc.) and behavioral variables (capacity to set prices or make profits, speed of innovation in the industry, etc.) to measure the degree of competition in the United States, Shepherd (1982) finds that during the 1939-1980 period antitrust policies “emerge as the strongest single cause of rising competition”.

Diagram 4: The Fordist form of competition



NB: The dominant institution of the form of competition is shaded. Arrows from other institutions indicate the key direct and indirect institutional complementarities with the dominant institution.

5 Finance-led competition (circa 1980s to present)

By the late 1970s, the profit rate in the United States had reached its lowest level since the beginning of World War II (cf. Figure 8). The country was losing markets to Western Europe and Japan, which were becoming increasingly competitive (Kovacic & Shapiro, 2000). International trade was hitting historically high levels (cf. Figure 4) as trade had been undergoing a process of liberalization since 1945. While in 1947 trade tariffs were in average almost as high as 40%, in 1980 they were around 10% (Durand, Copinschi, Martin, & Placidi, 2012). Competition was more globalized than it had ever been, and the country needed to change its strategy to stay on foot in face of increasing competition both for foreign markets and inside its domestic market. In order to solve this economic conundrum, a complete reconfiguration of the regulation regime took place, and with it a new form of competition emerged.

This reconfiguration gave birth to a radical departure from the Fordist form of competition and replaced it by a new one (the finance-led form) that would occupy a major role in what the Regulation School has labeled the financialized/“assetized”²⁶ (Aglietta, 2005; Boyer, 1998; Lordon, 2013) growth regime. **The finance-led form of competition was the result major transformations in antitrust enforcement and law, the intellectual property regime, financial regulation and the industrial organization landscape in the context of a technological revolution driven by radical innovations in the field of information and communications technologies (ICT). These transformations created institutional complementarities that shaped a new form of competition in which fierce competition between international networks of vertically disintegrated firms (“global value chains”) is conjugated with strong vertical market power, resulting in a polarization of profit rate levels between firms. The obtainment of high profit rates by some firms within global value chains is, in turn, necessary to satisfy the financial sector’s draconian demands of return on investment the liberalization of finance that started in the 1980s gives it the power to require in an era in which shareholders have taken over the governance of the firm.**

By the mid-1970s, the Chicago School started to gain influence in antitrust thinking in the United States. This school of thought, of which Richard Posner and Robert Bork are the best representatives, stands for loose antitrust enforcement. While antitrust during the Fordist competition era was dominated by the Structuralist school and its heavy attack on market power detention and exertion, the Chicago School, which came to dominate antitrust enforcement during the finance-led form of competition era, set efficiency gains and the expectable consumer welfare resulting from it as the main goal of antitrust. As Bork puts it in his influential *The Antitrust Paradox*, “the only legitimate goal of American antitrust law is the maximization of consumer welfare” (Bork, 1993). According to this school, high levels of concentration are not a problem as long as they translate into efficiency gains, which in turn are expected to reflect in an increase in consumer welfare. Chicago School’s benchmark of competition is not concentration ratios but potential competition: a firm might have a large market share, but as long as barriers to entry are not high, the threat of potential competitors would force it to behave competitively and translate the efficiency gains that come from size into lower prices and/or higher quality of the products sold²⁷. Consequently, the Chicago School considers *per se* rules to be useful in very limited cases such as cartelization. The rule of reason is privileged because it allows assessing in each case

²⁶ The original French term is “patrimonial”.

²⁷ We will expose in more detail Chicago School’s competition theory in Chapter II. The current description is simply meant to facilitate the understanding of the rationale of antitrust during the finance-led competition era.

whether efficiency gains can justify a merger or avoiding condemning a practice that the Structuralist School would have most of the times considered anti-competitive *per se*.

The Chicago School gained much influence in the 1970s and came to replace the Structuralist School as the mainstream thinking in antitrust by the 1980s. In 1981 Bork and Posner were nominated to the Courts of Appeals, and new heads of the FTC (James Miller) and the Department of Justice's antitrust division (William Baxter), also belonging to the Chicago School, were designated (Christophers, 2016). Economists and legal scholars keen to the Chicago School started to get more reception and their thinking permeated the courts, the DOJ Antitrust Division and the FTC. In Adams and Brock's (1989, p. 223) words, "the apostles of the Chicago School (...) "captured control of the antitrust agencies during the Reagan administration". The penetration of the Chicago School in these institutions translated into a U-turn in terms of competition policy.

Higher concentration ratios than the ones considered to threaten competition during the Fordist era started to be used to judge both horizontal and vertical mergers, and efficiency gains and potential competition started to become common arguments to approve mergers (Kovacic & Shapiro, 2000). From 1973 on, "several influential lower court cases used evidence concerning ease of entry to permit mergers that yielded high market shares" (Kovacic & Shapiro, 2000). This jurisprudence crystalized in the 1982 merger guidelines.

Regarding restraints of trade, the 1977 *Continental Television v. GTE Sylvania* case can be read as the turning point in antitrust enforcement and jurisprudence. GTE-Sylvania tried to reduce the number of competing retailers by "limiting the number of franchises granted for any given area [of the country] and requiring each franchisee to sell his Sylvania products only from the location or locations at which he was franchised"²⁸. When Continental Television was denied such a franchise, it filed a lawsuit alleging a violation of the Sherman Act. The above-quoted landmark case *United States v. Arnold, Schwinn & Co* had set a legal precedent prohibiting *per se* territorial restrictions on resale, but the ruling of the Supreme Court in *Continental Television v. GTE Sylvania* put an end to it. This ruling considered that "per se rules of illegality are appropriate only when they relate to conduct that is manifestly anticompetitive"²⁹, inaugurating so a new era of antitrust in which, once again, the rule of reason would be used to open the door to many practices that had been considered to constitute restraints of trade in the legal tradition of the *per se* rules in vogue during the Fordist era. After that case "all of these per se rules [regarding

²⁸ *Continental Television v. GTE Sylvania* 433 U.S., p. 38.

²⁹ *Ibid*, p. 49-50.

vertical price and non-price restrictions on distribution] were overturned [by the Supreme Court] and replaced by assessment under the rule of reason” (Anderson & Huffman, 2017). In addition, and not less importantly, this was the first case that made it to the Supreme Court in which it was ruled that antitrust cases should be assessed in terms of efficiency. This created a precedent on which to develop jurisprudence more tolerant towards what is considered to be a restraint of trade (Fox, 1980). One could compare the role efficiency gains started playing in American antitrust cases in the finance-led form of competition era to the role the concept of “reasonableness of prices” had played in the collusive competition era.

When efficiency gains were not quoted as an argument to relax antitrust enforcement on alleged restraints of trade, potential competition and potential scenarios were used instead. For example, regarding purchasing or supply patterns, during the 1980s, “often the courts were satisfied with a finding that substitute production could appear rather than whether it actually would appear in the market” (Fox, 1997). In that vein, the influence of the Chicago School also played a major role in shaping competition policy. During the 1970s and 1980s, the dominance of game-theoretic methods put forward by those schools gave enough flexibility to “generate equilibrium predictions in settings involving a wide range of conduct, from R&D decisions to advertising to product positioning, as well as the classic problem of oligopolistic pricing” (Kovacic & Shapiro, 2000). This flexibility was often used to avoid condemning conducts by alleging potential efficiency outcomes that would result from them, or potential competition as a guarantee of them not resulting in market power exertion.

Under the influence of the Chicago School, the balance between intellectual property and antitrust also shifted dramatically in favor of the former. Contrary to the Structuralist-School-inspired legal doctrine in vogue until the 1970s, the Chicago School considered that seldom does intellectual property constitute barriers to entry (Christophers, 2016). Consequently, even when markets are concentrated and intellectual property plays a major role, the threat of potential competition exists and mergers or supposedly restrictive conducts should not be condemned by antitrust agencies. This school of thought not only considers that intellectual property does not generally create barriers to entry; it also justifies the pro-competitive effects it has. Regarding trademarks, the Chicago School reasoning that the courts have been following since the mid-1970s considers them pro-competitive because they lower consumer search costs, create quality-control incentives and ease entry into the markets (McClure, 1996). Regarding patents, in 1988 new guidelines issued by the DOJ rescinded the “Nine No-Nos” embodied in the 1977 guidelines in favor of, once again, a treatment of antitrust cases related to alleged patent misuse based on the rule reason and not on *per se* prohibitions. This allowed antitrust authorities and courts to consider that

intellectual property owners do not have market power when close substitutes exist for the product or the process. Coupled with a broader definition of the relevant market, this approach has resulted in fewer condemnations in antitrust cases related to intellectual property licensing (Sell, 2003). Moreover, on the same line and year (1988), Congress passed the Patent Misuse Reform Act, which expanded the exemptions to patent misuse (Barr, 2011). Judge Justice Blackmun summarized the new mainstream in terms of the balance between intellectual property rights and antitrust when he wrote for a majority in the 1980 *Dawson Chem. Co. v. Rohm & Haas Co* case³⁰, that "the policy of free competition runs in our law... but the policy of stimulating invention that underlies the entire patent system runs no less deep".

The shift towards soft antitrust enforcement can be understood as the consequence of two historical trends (Encaoua & Guesnerie, 2006; Kovacic & Shapiro, 2000). First, antitrust had been extremely severe during the Fordist era. The new approach promoted by the Chicago School was therefore well received as a necessary counterbalance to what was perceived as an excess. Second, the strict antitrust enforcement of the Fordist period was seen as a factor contributing to the loss of American firms' competitiveness. If they wanted to be able to face their competitors at home and abroad, firms would need the degrees of freedom their European and Japanese competitors were benefiting from. As the Department of Justice itself put it in 1982, "antitrust laws should not be applied in a way that hinders the emphasis on competitiveness"³¹.

This same rationale justified the complementary reform of the intellectual property regime that started in the United States and expanded to the world during the finance-led form of competition era. If the United States wanted to be able to face foreign competition, they would need more freedom in the use of intellectual property. **Not only did antitrust become more intellectual-property-friendly since the 1980s; beginning at the same period, the entire American intellectual property regime was profoundly strengthened, extended and then exported to the world.**

During the late 1980s, the 1990s and the 2000s, the American intellectual property regime was extended both in terms of what is protectable under intellectual property law, the rights given to the owner of the intellectual property asset and the duration of the protection. In 1988, the Sonny Bono Copyright Term Extension Act extended the term of all copyrights (existing and future) by twenty years. That same year the Trademark Law Revision Act introduced, among other changes, the possibility of filing a trademark application before having used the name of the brand. This gave legal grounds for a firm to 'steal' a

³⁰ *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176 (1980).

³¹ Quoted by Hoff (1986).

competitor's goodwill that might have been created through the use of an unprotected brand (McClure, 1996). It also allowed a firm to register brands with the sole intention of not letting (potential) competitors use it to enter the market, even when the firm has no intention of creating a product under the protected brand. By legally protecting these practices, the law implied a "significant substantive expansion of trademark rights" (McClure, 1996). Seven years later, the Federal Trademark Dilution Act (1995) extended "protection from the realms of de jure infringement" (Christophers, 2016) in that it lowered the burden of proof of confusion by stipulating that confusion is not necessary for the value of the trademark to be diluted. On the patents side, several court rulings made software, databases and living entities patentable. The motives behind these extensions of the reach of patentability are in line with those of the softening of antitrust. In Coriat and Orsi's (2006) words, "it is as if, after American industry's extremely pronounced losses of competitiveness in the 1980s, a reaction were organized in the new technology fields in order to allow firms to gain privileged access to the basic knowledge provided by the American science system through a new IP law".

Not only were intellectual property rights expanded during the 1980s, but their enforcement was also strengthened. In 1982 the Federal Courts Improvement Act created the United States Court of Appeals for the Federal Circuit. This Court was given exclusive jurisdiction over appeals in patent-related cases. The main goal of this bill was to stop forum shopping by litigants in patent-related cases. But a non-negligible hidden agenda of this bill consisted in strengthening patent law enforcement (Christophers, 2016). The first decisions of the court "quickly touched on all important areas of patent law, from novelty to infringement, from non-obviousness to remedies. And over time, it has proven to be a more patent-friendly court than its scattered regional predecessors" (Merges, 2000). As a consequence of the creation of the United States Court of Appeals for the Federal Circuit, there was "a significant increase in the economic power of patents" (Sell, 2003, p. 67).

Another major reform of the intellectual property regime was the 1980 Bay-Dole Act. This law opened two possibilities. First, it allowed universities and research labs to file patents. Second, it allowed them to transfer "these patents to private firms in the form of exclusive licenses or creating joint ventures with such firms in order to take advantage of the knowledge thus transferred. This created the opportunity for such joint ventures firms either to trade on it or to make use of it to arrive at marketable products. A massive increase in the number of patents registered by university labs followed (Jaffe, 2000)" (Orsi & Coriat, 2006). By allowing private firms to own the results of publicly funded research, this reform destroyed the incentive to innovate through public grants that had characterized of the open science regime (Orsi & Coriat, 2006). As a result of all the reforms of the American intellectual property regime,

there was an acceleration of patenting in the 1980s and especially the mid-1990s in that country (cf. Figure 5).

By the mid-1990s intellectual property had been strengthened and extended in many ways in the United States. But it was not until the 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) that this new intellectual property regime became the new international standard. The TRIPS agreement represents a milestone in the history of intellectual property because it created the first truly harmonized³² international intellectual property regime, and it did so in the image of the United States'. Although two international treaties on intellectual property had been in place for more than a century (the 1883 Paris Convention, covering industrial property in the widest sense of the term and the 1886 Berne Convention, which referred only to copyright), "the internationally recognized rules were both few and lax. Signatory countries enjoyed great latitude to define their own national IPR [intellectual property regime] codes. The result was a wide heterogeneity of situations" (Orsi & Coriat, 2006). Moreover, before the TRIPS agreement "there was precious little institutionalized political-economic recourse if equal protections were not in fact afforded" (Christophers, 2016). As a result of the signature of the TRIPS agreement, patent rights were extended to "virtually all subject matter except plants and animals other than micro-organisms, including pharmaceutical products, chemicals, and pesticides" (Sell, 2004) across virtually every country in the world (162 countries, i.e. all the World Trade Organization members). It also interesting to point out that the TRIPS agreement not only exported the extensiveness and the strong enforceability of the United States' new intellectual property regime to the world, but that it also disseminated the American recently increased antitrust immunity of intellectual property rights to other countries. One of the three guiding principles of the agreement was "a requirement of consistency between national IPR-related competition policy and the TRIPS Agreement's principles of IP protection", which "must be read as a caveat against an excessive exercise of competition policy, which the TRIPS Agreement, by its purpose and express wording, otherwise leaves Members free to define. It means that they may not use antitrust regulation as a pretext to undermine the protection of IPRs as guaranteed by the TRIPS Agreement" (Ullrich, 2004).

Although the TRIPS agreement can be considered an export of the new American intellectual property regime to the world, other major world economic powers such as the United Kingdom and Japan had been actively pushing for such an international agreement since the mid-1980s (Christophers, 2016). **The reason of this concerted move towards a harmonized, strengthened and enlarged intellectual property regime in the 1980s is to be found in another important transformation that started in the**

³² For example, the TRIPS agreement created a uniform duration of patent protection of twenty years.

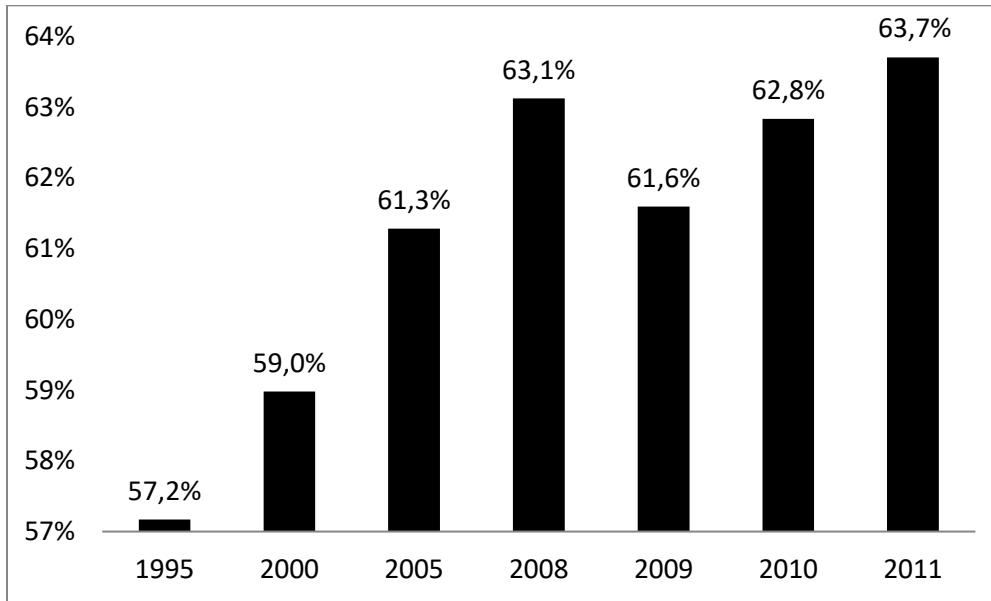
same decade and has institutional complementarities in the finance-led form of competition: vertical disintegration and offshoring.

Facilitated by a looser and intra-industry-mergers-friendly antitrust regime, there was in the 1980s a wave of “‘bust-up’ takeovers, in which undervalued conglomerates were purchased with the intention of being split back up into their component parts and either operated as free-standing companies or sold to buyers in related industries” (Davis & Cobb, 2010). The empirical research led by Lang and Stulz (1994) confirms this. Using data from global companies around the world, they show that by 1989 firms had divested 60% of the acquisitions they had made between 1970 and 1982 outside of their core business. Moreover, Davis, Diekmann and Tinsley (1994) find that during the 1980s, a third of the Fortune 500 firms was acquired or merged, resulting in a more core-business-focused corporate sector.

The withdrawal of the firm to its core competences was not only due to the dissolution of the hegemony of the conglomerate. It also manifested in a process of vertical disintegration across industries (Arndt & Kierzkowski, 2001; Baudry & Chassagnon, 2012; Chassagnon, 2009; Feenstra & Hanson, 1997; Krugman, Cooper, & Srinivasan, 1995; Milberg, 2004), the “major fact since the 1980s in terms of production systems and organization” (Weinstein, 2010, p. 10)³³. Vertical disintegration, in turn, took an international dimension. Starting in the 1980s, the vertically integrated firm has been replaced by networks of more core-competence-focused firms distributed around the globe that came to be known as “global value chains”. Different empirical measurements have been offered to account for this phenomenon. Feenstra and Hanson (1997) estimated the share of imported inputs in total intermediate goods in the United States manufacturing and found that it went from 6.5% in 1972 to 8.5% in 1979 to 11.6% in 1990. Similarly, Campa and Golberg (1997) measured the share of imported inputs in total inputs in the mid-1970s, mid-1980s and mid-1990s for the United States, Canada, Japan and the United Kingdom and found a constant increase for all countries across industries. Other measurements using global input-output data on domestic value added provided by the OECD’s TIVA database (cf. Figures 11 and 12) confirm this trend.

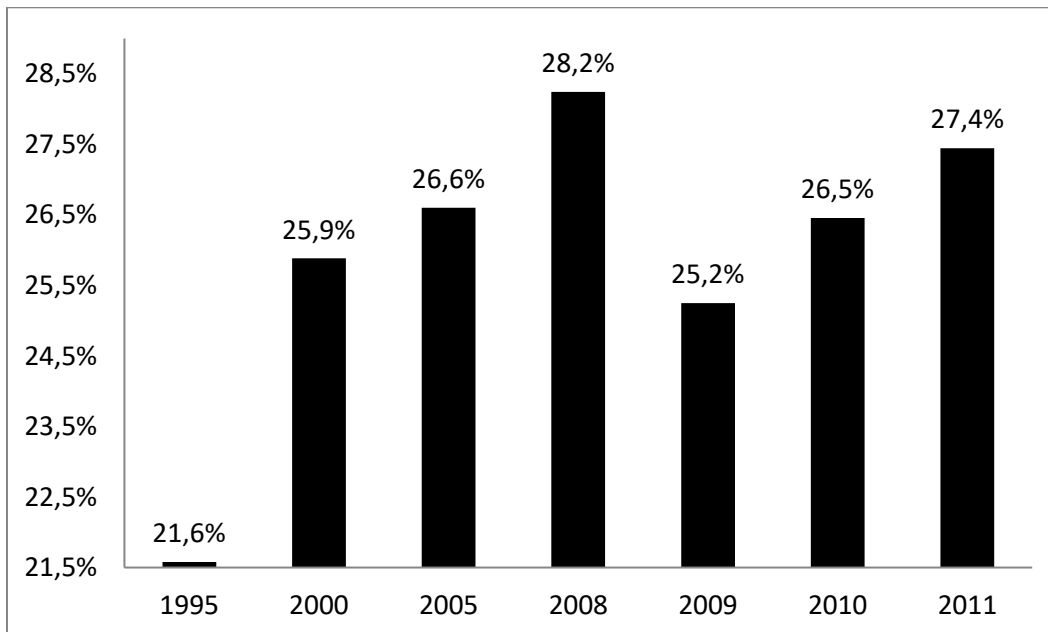
³³ The translation is ours.

Figure 11: Percentage of intermediary products imports in global imports (1955-2011)



Source: own elaboration based on TIVA database data

Figure 12: Value added coming from another country as percentage of total exports of the main 62 economies of the world



Source: own elaboration based on TIVA database data

The evolution towards an industrial organization landscape characterized by networks of firms more centered on their core competences and spread across the globe that started in the 1980s can be explained,

in part, by the fast development of ICT that started at the same period. However, ICT should not be conceived as the underlying cause of offshoring and vertical disintegration, but rather as an enabling factor (Yeung & Coe, 2015). Indeed, ICT have facilitated this process by allowing three things (Whittaker, Zhu, Sturgeon, Tsai, & Okita, 2010):

- 1) The codification and easy processing of complex information from one state of the production chain to the next (Balconi, 2002; Baldwin & Clark, 2000)
- 2) Flexible, computerized production machinery that allows capital-intensive manufacturing capacity to be shared and pooled like labor-intensive manufacturing (Brusoni & Prencipe, 2001; Langlois, 2003)
- 3) Supply-chain management tools, such as “enterprise resource planning” software and radio-frequency identification tags, that are pushing even labor-intensive industries up the technology curve (Abernathy, 1999)

The blend of these three items, in combination with improvements in transportation costs³⁴ and a continuous process of trade liberalization (Durand et al., 2012), has allowed firms to move from a model of vertically integrated domestic production to that of a constellation of more core-business-centered firms forming networks of production and distribution of goods and services around the world.

While many authors have been right in highlighting the importance of the development of ICT to account for offshoring and vertical disintegration, little attention has been paid to the link this latter process has with the parallel above-described transformation of the international intellectual property regime. The vertically integrated firm has split its once in-house production and distribution processes across many countries and firms (most of them not under its legal control) looking for cost advantages in terms of access to natural resources, infrastructure, access to markets, capacities and labor costs (Dunning, 2001), and retaining at the same time the control of the most profitable stages. However, this split production process is usually orchestrated by a “lead firm” that guarantees the performance of the global value chain. This includes being able to export the key aspects of a production technology it generally owns and to retain a considerable slice of the profits produced by the multitude of firms located in different countries the global value chain is made of (Baudry & Chassagnon, 2012). In doing so, a harmonious, strong, and overreached intellectual property regime has been essential. **Firms of the developed countries that fostered the TRIPS agreement (mainly the United States, Western Europe and Japan) have used its resulting global intellectual property regime to be able to export their**

³⁴ The OECD (2007) estimates that sea freight costs have diminished by approximately 60% between 1930 and 1980.

more productive technologies and designs to countries with lower labor costs or other country/region-specific advantages without risking the appropriation of the intellectual property assets underlying it. Moreover, the circumscription of lead firms to high value added immaterial core competences (design, a certain high-tech production process, etc.) on which their dominance of global value chains rely was only possible once the protection of immaterial assets was rendered strong enough around the globe for firms to be able to be legally ‘cut-off’ around a bundle of intellectual property assets on which their roles within the global value chains they participate in is based. In that manner, firms that retain the intellectual-property-based competences more relevant for the global value chain can disinvest in other processes and offload the costs and the risks associated to them to other firms, while retaining higher profits than other firms of the global value chain as a result of the key role they play in orchestrating it. In that manner, lead firms *coordinate the competitive process using their vertical market power within the global value chain*³⁵, while non-lead firms have no option but to submit to lead firms in order to benefit from their intellectual-property-protected key competences and the productivity level that comes with them, which they need to compete at the global scale. The transformations of the intellectual property regime and the global vertically disintegrated industrial organizational landscape that started to take shape in the 1980s must therefore be understood as two sides of the same coin.

We have seen so far how the evolution of antitrust, the intellectual property regime and the industrial organizational landscape since the 1980s present strong institutional complementarities. There is, however, a missing piece in the puzzle. In order to be able to portray the post-fordist form of competition and the link between competition and market power that characterizes it, we need to examine the institutional complementarities these transformations have with the parallel mutation of the financial system.

Much has been written about the transformation of the financial sector since the 1980s, which the literature has labelled “financialization”, a term that has taken many different meanings from author to author (Van der Zwan, 2014). It is out of the scope of this work to review in detail these transformations. Instead, we will pinpoint a series of changes in the financial sector (“financialization” hereafter) that constitute to our understanding the major institutional complementarities with the other transformations described in this section, and which comprehension will help us characterizing the form of competition that replaced the Fordist one.

³⁵ We will develop this in depth in Chapter 3.

The financial sector has been profoundly internationalized and liberalized after the Fordist era. The beginning of this process can be traced back to 1971, when the end of the Bretton Woods system implied, among other things, the end of capital controls. From that day on, it became increasingly easy to trade currencies and financial assets at an international scale without many restrictions, which resulted in a financial globalization that went hand in hand with the undergoing trade liberalization (cf. Figure 4). The dismantling of barriers to capital control unfolded over the decades to come, reaching a tipping point in Europe with the 1986 Single European Act, which set 1992 as the deadline to remove all capital controls between countries of the European Union. The later expansion of the European Union to the East would reinforce this trend in the Old Continent. During the 1990s, capital controls were progressively washed out in developing countries under the influence of the International Monetary Fund (Dierckx, 2011). In parallel, the 1980s were a decade in which sovereign bond markets were created around the world, generating new financial investment opportunities. Finally, through a series of deregulations that took place during the 1980s and 1990s, the barriers between different financial markets were lifted. This meant that it became possible for any financial institution (insurance company, bank, pension fund, etc.) to arbitrage with any financial asset (bonds, stocks, derivatives, etc.) in any financial center in the world. In respect to its effect on the transformation of the form of competition, we should highlight the importance of the dismantling of the Glass-Steagall Act among the numerous financial deregulations of the period. Although some legal loopholes had been exploited and some particular interpretations and legislative amendments to loosen it had been taking place since the 1960s, it was not until the Gramm-Leach-Bliley Act (also known as the Financial Services Modernization Act) of 1999 was passed that the separation between commercial and investment banking was fully put to an end. **As a result of the end of end of this separation, other complementary financial deregulations and the concomitant development of high-return financial innovations during the 1980s and 1990s (securitization, collateralized debt obligations, subprime credit, etc.), the role of the financial sector switched from a subordinate one based on financing the expansion and the R&D of firms to a dominant one in which firms would adapt their competitive strategies to provide financial institutions a high return on investment.**

It is because of these transformations that we can speak of “financialization” (Auvray, Dallery, & Rigot, 2016). **Although, as we have seen along this chapter, the financial sector has played an important role in driving the expansion and the consolidation of corporations through history, it was not until the end of Fordism that this sector was given so much freedom by historical standards. The novelty of these deregulations lies in the fact that they allowed the financial sector to subjugate the other institutional forms to it, including the form of competition.** Indeed, this freedom of movement built

two institutional complementarities that have shaped the finance-led form of competition: the financialization of intellectual property and the financialization of the corporation.

As we have shown above, the reforms of the intellectual property regime that begun in the 1980s allowed corporations to own inventions resulting from basic knowledge. In addition, both inventions and discoveries gained an increasingly important role for (lead) firms, which were now restricted to their immaterial core competences on which their dominance of global value chains rely. **Previously, those “common knowledge bases” (Arrow, 1962) were developed and funded by the state following a long-run financial logic, and firms could not appropriate it. Once firms started gaining ownership over basic knowledge and intellectual property assets became more important than ever for firms to survive competition, the financial sector partially took over the state’s role of financing long-term research and, since its output was put on the market for the first time, it had to price it.** The financial sector therefore took over roles that had belonged until then to the state using financial instruments that were more suited to the new intellectual property regime than those used by traditional banks. Regarding financing, financial institutions are more suited than banks to finance intellectual property-intensive firms for four reasons (Mouhoud & Plihon, 2009). First, basic research implies a high risk and financial instruments allow diluting it across different agents. Second, since intellectual property assets are specific investments (and therefore hardly re-sellable), a bank cannot ask for collateral. Third, given that immaterial investments have random yields, companies cannot repay loans on a pre-fixed regular basis as with traditional credit lines. Finally, banks’ traditional evaluation techniques based on balance sheet information such as scoring are not suited to evaluate investment projects based on knowledge creation. **Then, once the state lost its monopoly as the financier of long-term basic knowledge creation, financial instruments such as risk capital filled that gap. Because traditional loans were not suited to finance this, financial instruments did it by rendering inherently illiquid investments liquid through the stock exchange.** Financial regulations were adapted accordingly to meet this goal. A regulation known as Alternative 2 allowed loss-making firms with a lot of intellectual property assets to be listed in the NASDAQ, and the ‘401k regulation’ allowed pension funds to invest in high-risk bonds and assets usually related to loss-making firms with a high stock of intellectual property assets (Coriat & Weinstein, 2011). In this new intellectual-property-friendly stock exchange, investors can find liquidity in their intellectual-property-related investments by reselling at any time their assets. **In that manner, the stock exchange plays the role of pricing immaterial assets that used to be outside**

of the market, although pricing relies heavily on “confidence, fashion and mimetism”³⁶ (Mouhoud & Plihon, 2009).

Just as finance penetrated the firm through intellectual property, it also did so by changing the conception of value creation and appropriation and, in that manner, redefined the form of competition. The internationalization and liberalization of the financial sector recalled above gave investors the possibility to move capital from one firm to the other across countries in little time, a trend that accelerated with the evolution of ICTs. This created a “liquidity paradox” for shareholders (Auvray, Dallery & Rigot, 2016). Indeed, an active is considered to be liquid if a) it can be easily sold without cost and b) its future value is predictable without capital loss risks. The deregulation of finance recalled above and the financialization of intellectual property made shareholders’ capital and intellectual property assets (which in many cases constitute a large part of firms’ capital) liquid in the sense of a). However, for the same reason, the capacity to constantly trade financial assets in the stock exchange made their future value unpredictable. The way of breaking the liquidity paradox has consisted in shareholders demanding high dividends (Auvray, Dallery & Rigot, 2016). The *mechanisms* through which shareholders have been implementing this strategy within the firm (managers’ bonuses linked to stock prices, shareholders’ foot voting, etc.) have been widely described in detail in the literature as a transformation of corporate governance into a “shareholder governance” model (Caby & Hirigoyen, 2001). But their *capacity of implementing those mechanisms* relies ultimately on the liberalization and internationalization of finance: if a firm does not deliver dividends as high as other firms’ or alternative financial assets, shareholders’ capital can easily fly away and make its stock price go down. This, in turn, could not have been possible without the liquefaction of firms’ capital that financialization created (Auvray, Dallery & Rigot, 2016). As a result, the share of dividend distribution by American nonfinancial corporations over cash flow has been increasing since the 1980s and more than doubled over two decades (Crotty, 2005).

Since the 1980s, the firm is therefore conceived as “a collection of assets earning varying rates of return” (Fligstein, 1993, pp. 238–239) that shareholders can pressure to be set at high levels (usually not below 15%). **The question that arises is how, in a context of increased globalized competition, can firms deliver such levels of rates of return. A part of the explanation has been widely discussed in the literature: the deterioration of the share of labor in value added and the outsourcing of production to countries with lower wages (Harrison, 2005)³⁷, which has also significantly contributed to**

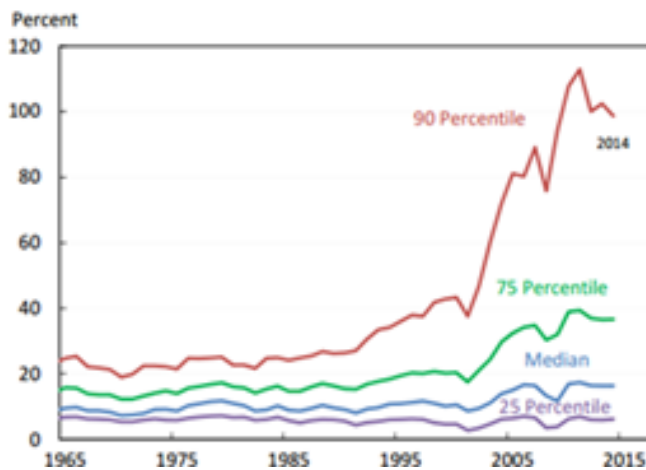
³⁶ The translation is ours.

³⁷ Freeman (2006) has calculated that the after “the collapse of Soviet communism, China’s movement toward market capitalism, and India’s decision to undertake market reforms and enter the global trading system” the size of

reducing production costs (Milberg, 2006). Nevertheless, we believe that another part of the explanation lies in the reconfigured finance-led form of competition which building blocks we have presented along this section.

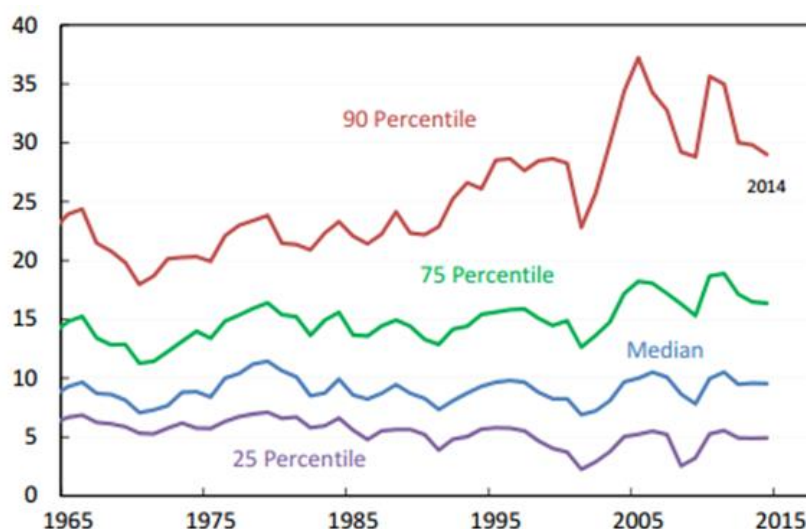
In the finance-led form of competition, firms are centered on their core competences and linked to each other through global value chains spread around the globe. Competition takes place between global value chains at the international level. Within global value chains there is an uneven power relation between firms according to which the ones performing the crucial stages of the production and/or distribution process can, usually through their ownership of intellectual property assets around which their legal frontiers are drawn, act as leaders that coordinate the production process and allocate profits in their favor (Baudry & Chassagnon, 2012; Chassagnon, 2009). In an aggregate level, this translates into an increase in profit rate differentials during the finance-led competition era, as Figures 2 and 13 show.

Figure 2: Return on invested capital excluding goodwill, U.S. publicly traded nonfinancial firms



the global labor pool went “from approximately 1.46 billion workers to 2.93 billion workers”, which represents a duplication of the world’s labor force in low-wage countries that happened “almost all at one in the 1990s”.

Figure 133: Return on invested capital including goodwill for U.S. publicly traded nonfinancial firms (in percentage)



Source: Furman and Orszag (2015)

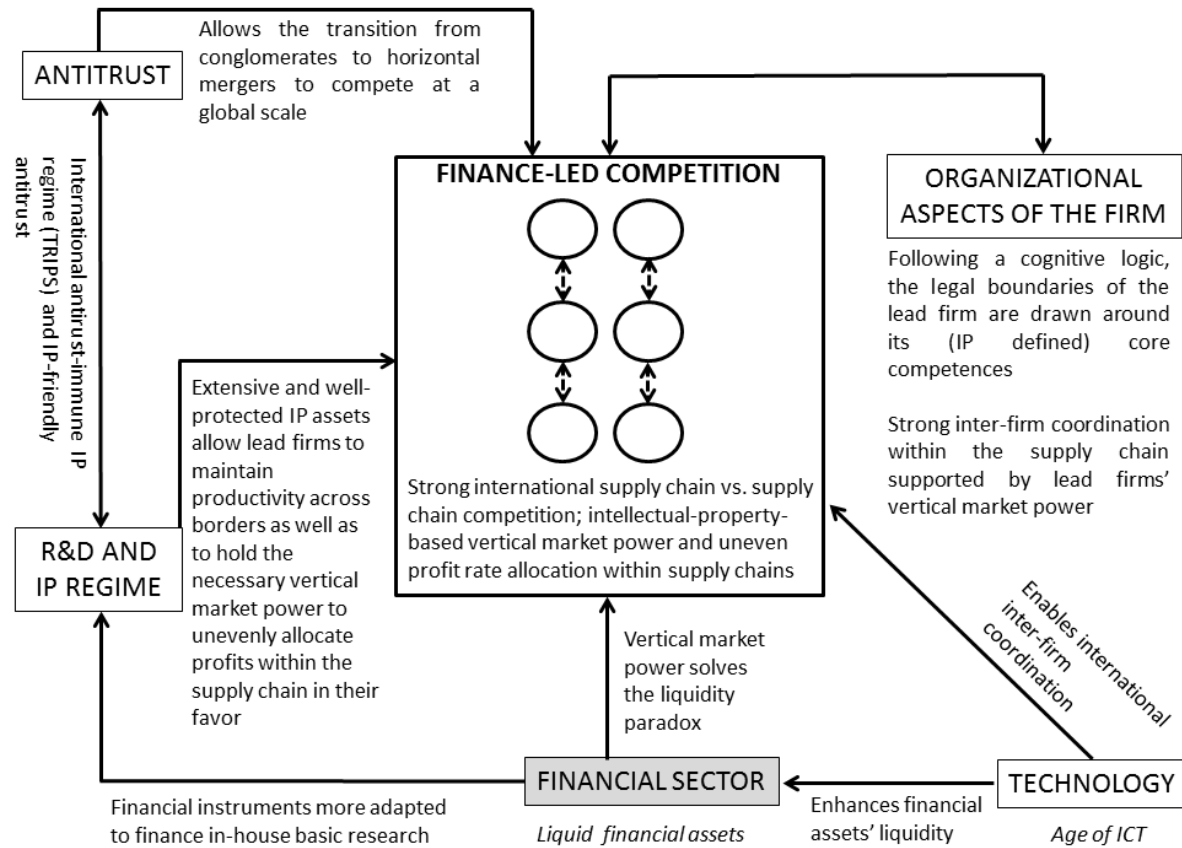
The process of uneven allocation of profits is the outcome of the asymmetries of market power between the firms that participate in global value chain. The lead firm(s) that control(s) the key aspects of the production or the distribution process can use its/their power to pressure down the price it pays to subcontractors of its chain, while keeping the final price low to compete with other supply chains, minimizing so its size and capital expenditure and offloading risk to other less powerful members of the global value chain. In this form of competition, there is a “hybridization of the taylorist and cognitive logics” in which “the cognitive division delimitates the competence field of the [*lead, we add*] firm in which the investment will be concentrated following an excellence and long-term logic. Taylorist division is used to externalize the generic assets of the firm in cost-minimization logic in a minimum time: it’s the ‘minimal cost, minimal delay’ logic” (Mouhoud & Plihon, 2009).

The building block of the finance-led form of competition can now be woven together to understand the links between the different institutional complementarities on which it is built. Facing a declining profit rate, financialization has been the driving force for American and other major economic powers to restore profitability. The ‘liquefaction’ of capital it brought about allowed shareholders to demand high rates of return on their stocks. In a context of increasing globalization and a new technological revolution led by ICT (Perez, 2010), vertical disintegration and offshoring has constituted the mean through which shareholder’s demand of high profits has been met. On the one hand, offshoring has allowed firms to

minimize costs, especially labor costs. On the other hand, vertical disintegration has allowed firms to minimize their capital expenditure and offload risk to other members of the supply chain. Moreover, lead firms possessing key competences can capture a higher rate of the value created within the global value chain of which they participate as orchestrators. This capacity to exert market power within the global value chain, in turn, has been enabled by the strengthening, the extension and the internationalization of the intellectual property regime and a consequent accommodation of antitrust. The latter has accommodated not only to avoid hindering the exertion of intellectual property rights, but also to allow firms to merge horizontally in order to compete at a world scale while they vertically disintegrate.

A symbiotic logic between competition and market power proper to the finance-led form of competition takes place in this logic. Because competition is strong and global, firms competing in rival global value chains need to constantly minimize costs and match competitors' final prices to stay in the market. At the same time, some lead firms have vertical market power within global value chains that comes from the key competences (crystalized in their intellectual property assets) they bring to the rest of the firms of the global value chain without which the latter could not produce at a competitive level. This market power gives lead firms the capacity to coordinate the competitive process by controlling the global value chain's production process (who produces what, how and where), as well the capacity to retain a higher share of the value created within the global value chain, satisfying in that manner shareholders' demands of high returns on investment. Financialization is therefore the driving force and the structuring rationale of the current form of competition in which market power and competition are linked symbiotically.

Diagram 5: The finance-led form of competition (circa 1980s to present)



NB: The dominant institution of the form of competition is shaded. Arrows from other institutions indicate the key direct and indirect institutional complementarities with the dominant institution.

Conclusions

Forms of competition have evolved over time in the United States as a result of complementary institutional changes, the evolution of the firm and some major historical events. The dialectic relation between competition and market power has been a constant source of tension and change that has been at the core of the transformations of forms of competition.

Around the 1840s, when the country was economically unified under a national market and fully capitalist production relations became the standard, competition lacked any kind of regulation, be it by the states or through inter-firm coordination. Firms were evenly matched and barriers to entry weak. Therefore, market power could not serve as a mean of regulating the anarchic competitive relations between firms that resorted to predatory prices to survive in the market. The result of this dynamic was constant instability and overproduction crises. The predatory form of competition (1840s to 1860s) was unstable because competition took place in an institutional and market power vacuum.

Once this inherent instability became apparent to firms, they resorted to horizontal market power to regulate their competitive relations. Trusts and pools were the first obvious ways to achieve this goal. While the former were too weakly enforceable to endure, the development of the latter was stopped by the nascent federal antitrust legislation. The Federal state had stepped in to provide the elementary coordination necessary to take competition out of its ruinous isolation. However, antitrust was still one step behind firms, who realized that horizontal concentration was still a legal option. Nevertheless, in the absence of barriers to entry, market power was still not stable, and it could therefore not stabilize competition. As a result, the collusive form of competition (1870s to 1910s) was also unstable and profits were unable to grow steadily.

When horizontally-consolidated firms started integrating vertically and using their now relevant enough intellectual property assets to create barriers to entry, market power became sufficiently robust to cast away ruinous predatory competition. However, at this point a redefinition of the purpose of and the forms taken by market power took place. During the constricted form of competition (1920s to 1945), dominant firms with large market shares would set high prices and dominate markets with the (successful) intention of *hindering* competition. Market power had not only changed its form from collusion to vertical integration and intellectual-property-based barriers to entry; it had also changed its purpose from regulating competitive relations between firms to replacing them by market power-enforced decisions about the functioning of the market made by dominant firms.

This logic would change after WWII, when Fordism, mass consumption and a strict antitrust enforcement transformed completely the form of competition into one based on conglomerates of vertically integrated firms unable to obtain or exert market power. Strong long-run competition on prices in mass markets left firms with no option but to expand diagonally, constantly improve their productivity and introduce new products to grow. As productivity increases began not being high enough to absorb increments in salaries and to face foreign competition, profitability hit a historical low and the Fordist form of competition (1945 to 1970s) came to an end. As during the predatory competition period, market power was absent, but this time antitrust and the state in a largest sense regulated competitive relations between firms, while during the predatory competition era regulation was missing. However, these regulations were, in the long-run, ineffective in avoiding competition's self-destruction, as they resulted in a historical descent of the rate of profit that took it to pre-WWII levels.

The 1980s represented a breakthrough that set the bases for a new form of competition. Antitrust was relaxed, the intellectual property regime extended, strengthened and internationalized and production was vertically disintegrated and internationalized. The liberalization of finance towards a regime in which financial assets (including firms' stocks, debts and intellectual property assets) became liquid gave the financial sector the capacity to demand high dividends to firms. Competitive dynamics switched to strong international competition between global value chains within which vertical market power based on intellectual-property-protected key competences gives lead firms the capacity to coordinate the production process and to influence profit allocation in their favor. As a result, profitability was restored, but its repartition between firms became increasingly heterogeneous. While lead firms can obtain higher profits to respond to shareholders' demands, other firms in the global value chain have to settle for small profits, as they are dependent on lead firms to be able to achieve the productivity level necessary to participate in global competition against other global value chains. In this dynamic, a *symbiotic* relation between competition and market power takes place: vertical market power is the mean by which coordination between the firms in the global value chain takes place in order to face global strong horizontal competition between global value chains; in that manner, vertical market power *coordinates* horizontal competition.

The study of the history of forms of competition in the United States shows that, in the long-run, competition cannot exist without market power. A quick reading of this history would suggest that this is the case because, as the competition paradox goes, competition leads to market power, which in turn annuls competition. However, as we have seen, during the collusive competition era (1870s to 1910s) and since the 1980s, market power has also played the role of *coordinating* competition, not annulling it. Moreover, we have seen that the ways in which it has done so, as well as the way in which, during other

periods, competition or market power have annulled each other, have taken different forms that can only be explained when the institutional environment of competition is studied. **While it is true that competition eventually leads to market power, history has shown that this does not necessarily mean the latter ends up annulling the former when it occurs.**

Having learnt from the study of history, we now have to pursue our investigation by interrogating theory. In the next chapter we will review competition theories to analyze how they account for the link between competition and market power.

Chapter 2: A critical cartography of competition theories

"Competition is by no means only an incentive-mechanism but, first of all, an instrument for the deprivation of power (Entmachtungsinstrument)... the most magnificent and most ingenious instrument of deprivation of power in history"

Böhm, *Reden und Schriften*, p. 22, quoted in Vanberg (2002), p. 59

Introduction

The historically heterogeneous and variant link between competition and market power in competition theory

In **Chapter I**, we saw how, throughout the American economic history, the nature of the relation between competition and market power varied. We have identified two types of links between these two forces: antithetical and symbiotic. During the Predatory Competition (circa 1840s to 1860s) and the Fordist Competition (circa 1945 to 1970s) eras, competition reigned and hindered market power; symmetrically, the Constricted Competition era (circa 1920s to 1945) was characterized by the exertion of market power mechanisms that set obstacles to competition. In all of these cases, competition and market power have been antithetical. During other periods, nonetheless, we identified a symbiotic relation between the two: in the Collusive Competition era (circa 1870s to 1910s), market power played the role of regulating competition to avoid the ruinous cutthroat price wars characteristic of the Predatory Competition era; in the current Finance-led Competition era (1980s to present), we saw that market power plays the role of articulating competition. Therefore, market power and competition have established a symbiotic relation in these two latter cases.

In terms of the balance between competition and market power, we have identified two major historical swings: one that goes from a competitive landscape in the 1840s (Predatory Competition) to a market-power dominated one that lasted until World War II (the end of the Constricted Competition era). Then there has been another swing in favor of competition when the Fordist Competition era started (circa 1945). Since the 1980s, the Finance-led form of competition poses the puzzling scenario of intensified

international competition in which global value chains became central coupled with a considerable increase in long-run profit rate differentials between firms, which would indicate an increase in market power.

The goal of this chapter will be to analyze the link between competition and market power in competition theory in light of the findings of Chapter I. We will visit the existing competition theories, which have been majorly influenced by the American economic history, and analyze to what extent are they capable of capturing the different natures and the evolution of the link between market power and competition we have observed.

For each theory, we will explore the underlying concepts of competition and market power as well as the mechanisms that animate and relate the two. In doing so, we will unveil the nature of market power implicit in the market power creation mechanisms we will describe. We will then create a cartography that groups competition theories according to this analysis and that will pay special attention to how they can or cannot account for the fact that competition leads to market power asymmetries, a process that is key to understand the current Finance-led competition landscape in which firms participating of a vertically disintegrated mode of (global) production obtain heterogeneous long-run profit rates (Dedrick, Kraemer, & Linden, 2010; Pavlínek & Ženka, 2016) in a highly internationally competitive scenario.

A reading grid of the link between competition and market power in competition theory

Our endeavor of characterizing the link between competition and market power in the different existing competition theories implies a choice of focus. Because our goal is to understand how competition theories conceptualize this link and, consequently, can or cannot account competition leading to market power asymmetries that explain long-run profit rate differentials, we will focus on three main points.

1) Does competition lead to market power asymmetries that result in long-run profit rate differentials between firms?

For each theory, we will show to what extent and through which mechanisms it can justify or deny the assertion according to which competition leads to some firms obtaining and exerting market power, resulting in them obtaining higher profit rates in the long-run. **We will call this the “market power paradox”** in reference to the concept of “monopoly paradox” that Foucault coined in his extensive study of the ordoliberal economic doctrine. According to this paradox, “monopoly is considered to be a half-natural half-necessary consequence of competition in a capitalist regime; that is to say that competition cannot be let to be developed without seeing appear, at the same time, monopolistic phenomena that have

precisely the effect of limiting, ease, ultimately annul competition. *It would be therefore part of the historical-economic logic of competition to suppress itself (...)*” (Foucault, 2004, p. 140, emphasis added)

2) Is the concept of competition a static or a dynamic one?

Studies on competition theories have so far focused on the important although insufficient distinction between “dynamic” or “behavioral” (Benzoni, 1991; Cayla, 2014; Guerrero, 1994; McNulty, 1968; Metcalfe, 1989; Moudud, 2010; Shaikh, 2008; Tsoulfidis, 2015) and “static” theories. In static theories, competition is identified to a market structure understood as a set of conditions (a state of nature) that defines if the conditions for a competitive scenario are met or, on the contrary, they are not, which would give some firms market power over others. In dynamic competition theories, on the contrary, competition is identified to behavior, a process, and not defined by a market structure, but rather by how firms act and interact. The consequences of these two opposite views on the nature of the concept of competition are major in terms of how each theory may account or not for the market power paradox. In static theories, the market structure will heavily influence whether competition or market power prevails relatively independently of firms’ behaviors. Consequently, if market power asymmetries that can account for long-run profit rate differentials between firms exist, static theories would argue that they are mainly the result of a certain type of market structure. On the contrary, in dynamic competition theories, if market power asymmetries can be developed, they are the result of the behavior of certain firms (for example, choices related to innovation) that, relatively independently of the market structure, allows them to obtain higher profit rates in the long-run.

3) What is the scope of competition?

We have shown in the previous chapter that the current Finance-led form of competition is characterized, among other things, by vertical disintegration and long-run profit rate differentials between firms that participate in the same (vertically disintegrated) global value chain. These phenomena are closely related to competition, market power and their links. Consequently, **we will identify for each theory what the scope of competition is by differentiating horizontal competition from vertical competition.** Horizontal competition refers to competition between two firms of the same industry located in the same tier of the supply chain that compete in the same market. Vertical competition, on the contrary, refers to competition between firms located in different tiers of the same supply chain. These firms, which can belong to different industries, establish a relation of supplier and client. **Within the vertical competition scope, we will distinguish semi-vertical competition from fully vertical competition.** In the former, competition takes place between *direct* supplier and client firms: suppliers compete with their clients and/or vice versa. In fully vertical competition the scope of competition is the entire supply chain. As a

consequence, not only is there competition between supplying and client firms, but also between all of the firms that participate of a supply chain, or even between supply chains understood as a whole.

Opting for this particular reading grid to group competition theories implies overlooking some of their features so we can highlight what interests us. In order to avoid getting lost in the myriad of nuances we can find between and within theories, we chose to group theories that share some basic common principles we consider to be crucial to the purpose of our cartography. This means that our explanations will only focus on some common essential trends each group of authors/schools share and that we will overlook aspects of the theories that do not serve directly our purpose. In terms of the resulting grouping, this implies that authors belonging to different schools of thought who may even have opposite views regarding many central aspects in economics in general or regarding some features of competition theory we chose to overlook might be placed in the same or similar positions in our cartography. Symmetrically, authors or schools of thought that share a common theoretical background can belong to different groups in our cartography if their competition theories differ in the way in which they answer the question we will ask them.

Structure of the chapter

The chapter will be structured as follows. **Each section** will group different competition theories that, to the purpose of our analysis, can be considered to be similar, namely Marxian, Neoclassical, Imperfect competition and Monopoly Capital, Transaction Cost Theory and Evolutionary theories. These groupings, as we will explain in detail in each subsection, group competition theories that share some basic common principles we consider to be crucial for the purposes of our cartography, especially regarding the notion of competition and its link to market power, regardless of differences they might have regarding issues such as the competitive mechanisms at play. **Each subsection**, in turn, will be devoted to exposing a particular theory, **the last subsection of each section** being devoted to concluding remarks that will sum-up how the theories of the section can be identified in terms of our reading grid.

Finally, **the conclusions** will present, in the first place, the cartography derived from the analyses of the previous sections (Figure 14) and a summary of all the sufficient and non-sufficient mechanisms identified in the different competition theories that explain long-run profit rate differentials (Figure 15). Based on the analysis of the cartography and these mechanisms, we will make **three major conclusions**. **First, we will show that none of the existing competition theories has a fully vertical scope** in the sense we have given to that term above. **Second**, we will show that **the dynamic/static distinction**, although relevant to characterize competition theories, **is not sufficient to understand how each of them**

responds to the market power paradox. Third, we will show that **the vast majority of competition theories considers market power exclusively as an obstacle to competition** and that, even when they do not, **they are all incapable of conciliating price competition with long-run profit rate differentials**. We will therefore differentiate market power mechanisms that consider market power to be an obstacle to competition (e.g. barriers to entry, rent-earning resources) from what we will call “positional market power” mechanisms, which we will define as mechanisms in which market power is exerted as a strategic obtainment and usufruct of a particular link with other agents as a result of multilateral strategic choices by all of the agents *in a competitive context*.

These conclusions will lead us to set the bases of **Part II** by the end of the chapter. We will argue that, in order to be able to simultaneously account for long-run profit rate differentials and strong price competition, competition theory needs to take a fully vertical scope and consider a positional market power mechanism. Developing theoretical contributions in that direction will be the object of **Chapter III**.

1 Competition and the labor value theory: the Marxian tradition

1.1 The central role of competition in the Marxian branch of the classical tradition

While Classical theory represents a unified body of literature, there are certainly important differences between authors belonging to it that cannot be downplayed. Despite the remarkable contributions of authors such as Adam Smith (1976), David Ricardo (1891) or John Stuart Mill (1973) to competition theory (McNulty, 1968), we will devote our analysis to the Marxian tradition, which, to our understanding, and as we will show along this chapter, is the branch of the Classical School based on labor value theory that has developed the most this topic³⁸.

Competition plays a central role in the Marxian classical tradition; it is the force that assures that all the other laws of the classical representation of the economic processes take place. Its importance comes from the fact that it is what assures that the cornerstone of this ramification of the Ricardian version of classical theory, the value law, is verified. The presence of competition is therefore, in the Marxian view, a condition of possibility for economic science. In John Stuart Mill's words:

“So far as rents, profits, wages, prices, are determined by competition, laws may be assigned for them. Assume competition to be their exclusive regulator and principles of broad generality and scientific precision may be laid down, according to which they will be regulated” (Mill, 1973, p. 306).

Then, in order to fully understand the Marxian theory of competition, we need to take a step back to the cornerstone of this branch of classical theory: the value law. It is not our purpose to discuss the value law in classical theory itself, which would exceed the scope of this investigation. **This subsection is aimed at setting the basic theoretical grounds to understand how the competition mechanisms described in the following two subsections are subject to the labor value law that constitutes the backbone of Marxian economic theory. Therefore, the way in which Marxian theory will answer the market power paradox through its competition theory is subject to making that answer compatible with the labor value law.** Hence, we will present an extremely succinct and general explanation of this law that

³⁸ Other authors belonging to the Classical Schools such as Say or Bastiat have successors that developed a different theory of value based on utility and scarceness. The contributions of these authors to competition theory will be examined in other sections of this chapter.

focuses exclusively on the mechanisms that make commodities be sold at their values. Since we expect to understand the role that competition plays in articulating these mechanisms, our extremely simplified explanation of the value law will be sufficient. We will follow Marx's *Capital* since we consider this book to be the ultimate development of a logic trail of classical authors' contributions to the branch of the classical theory that is based on the labor value law.

A large part of classical authors built representations of the entire economic system on the same ground stone: the value law. This law is a logic consequence of a fundamental question of Political Economy that the classics have answered in the same way: what determines the exchange value (i.e. the amount of another commodity it can be obtained by selling it in the market) of a commodity? The classics' answer is, in a nutshell, "human labor". But for this answer to mean something an understanding of the implications of what human labor is in a capitalist society is needed (something we will not enter into in detail here) and the mechanisms of competition need to be specified for the answer to hold. The latter will be the object of this subsection.

In *Capital* (2015), Marx offers a very elaborated justification of this answer that we will however reproduce here in a succinct way. He begins by pointing out that if two commodities A and B are exchanged in the market, they are being socially recognized as equally valuable. If one unit of A is sold for one unit of B, this means that there must be something both commodities possess in the same amount and makes them equal. One can easily see that use values (the technic characteristics of the commodities that give them some use desired by the purchaser –value use-) are not that common "content"³⁹. If a pineapple is exchanged for a pen, it is obvious that these two commodities differ in their use values. Nevertheless, all the commodities share one characteristic: they are all the result of human labor.

More precisely, they are the result of human abstract labor. Marx differentiates *concrete* labor from *abstract* labor. The former refers to the specific activity in which labor is involved, the concrete form that labor takes to make a use value (i.e. building a house, sewing, fishing, etc.). On the contrary, abstract labor refers to the abstract (i.e. regardless of the task it performs) "expenditure of human labor power", i.e. two different concrete labors. Although the concrete labors employed to produce the pineapple and the pens are different, they both have in common being the product of abstract labor. They are both "productive expenditure of human brains, nerves, and muscles, and in this sense are human labour" (Marx, 2015). Therefore, "the equalization of the most different kinds of labor can be the result only of an abstraction from their inequalities, or of reducing them to their common denominator viz. expenditure of

³⁹ The use of the word "content" should not be interpreted as a personal view of value as a content in the discussion on the value form.

human labour power or human labour in the abstract” (Marx, 2015, p. 87). Or, put differently, “when we bring our products into relation with each other *as values* to the extent that we see these articles *only as material receptacles* of homogenous human labour ...” (Marx, 2015, p. 242).

The question that follows is how we can measure that abstract labor that two commodities exchanged in the market have in common. The first thing to notice here is that value is inherently a social concept. Given this, abstract labor can only be conceived in social terms. This has two major implications that interest us for our purpose. First, it means that the expenditure of labor power that matters is not the individual’s but the social one. In fact, if an individual took 5 hours to make a pen but, in average, the society makes it in 2 hours, the amount of abstract labor that will be recognized in the market when the pen will be exchanged is not 5 hours but 2 hours. Second, as Adam Smith points out, when calculating the value of a commodity, “the different degrees of hardship endured, and of ingenuity exercised, must likewise be taken into account. There may be more labour in an hour’s hard work than in two hour’s easy business” (Smith, 1976). This leads Marx to specify two things. Regarding the first remark, Marx states that the labor that is represented when two commodities are exchanged in the market is not only abstract but also a “socially necessary labor time”. This means that the value of a commodity depends on the average time society needs to produce it “under the normal conditions of production, and with the average degree of skill and intensity prevalent at the time” (Marx, 2015), and not the individual time each producer might need to do it. Regarding the second remark, Marx introduces the concept of simple labor as the common unit to which more complex labors can be reduced:

“It is the expenditure of simple labour power, *i.e.*, of the labour power which, on an average, apart from any special development, exists in the organism of every ordinary individual. Simple average labour, it is true, varies in character in different countries and at different times, but in a particular society it is given. Skilled labour counts only as simple labour intensified, or rather, as multiplied simple labour, a given quantity of skilled being considered equal to a greater quantity of simple labour. Experience shows that this reduction is constantly being made. A commodity may be the product of the most skilled labour, but its value, by equating it to the product of simple unskilled labour, represents a definite quantity of the latter labour alone. The different proportions in which different sorts of labour are reduced to unskilled labour as their standard, are established by a social process that goes on behind the backs of the producers, and, consequently, appear to be fixed by custom” (Marx, 2015).

Now that the mystery of the labor value has been (extremely roughly) revealed, now that we know what makes two commodities being exchanged as equals in the market, another question arises. How does it happen? How do people know how much socially necessary labor a certain commodity represents? Smith,

on whose and Ricardo's work Marx builds his theory, was already conscious of the problem this question entails. In fact, Smith had already noticed that in capitalism, contrary to what 'happened'⁴⁰ in the "early and rude state of society", the division of labor that characterizes capitalist societies has two consequences that inhibit the straightforward recognition of the socially necessary labor time represented by a commodity. In fact, if every person is dedicated to perform a single or a few tasks while he/she relies on others to acquire every commodity that he/she requires to live, how does he/she know how much time is socially required to produce the commodities he/she is purchasing? The answer to this problem is given by the laws of competition.

1.2 The mechanisms of competition in Marxian theory⁴¹

In order to explain the mechanisms of competition in the Marxian tradition, we must keep in mind that one of the premises of capitalist mode of production, which is consistent with Smith's stress of the extension of the division of labor in capitalism, is that "capital exists and can only exist as many capitals, and its self-determination therefore appears as their reciprocal interaction with one another" (Marx, 1993, p. 414). Regarding the justification of this statement, Weeks tells us that "Marx's analysis has greater sophistication because he begins by asking the fundamental question: why is there competition? The answer to this question reveals the historically specific character of capitalism. Competition is the historically specific result of the loss of the ability of people to produce. This loss results from the separation of labor from the means by which work is realized, from their means of production" (Weeks, 2012).

Capitalism is therefore only possible if a multiplicity of interacting capitals exist and their interaction is nothing more (and nothing less) than competition. In Marx words, "competition is nothing more than the way in which the many capitals force the inherent determinants of capital upon one another and upon themselves" (Marx, 1993, p. 651). "Conceptually, *competition* is nothing more than the inner *nature of capital*, its essential character, appearing in and realized as the reciprocal interaction of many capitals with one another" (Marx, 1993, p. 414, emphasis in the original).

⁴⁰ We use quotation marks since we interpret Smith's rude and primitive society as a figure he employed to stress some features of capitalism by opposing these two societies, and not an actual society that has existed.

⁴¹ We will base this section on Marx's own writings as well as on certain interpretations of them and further developments of its theory by other authors that we judged pertinent to our investigation.

We must therefore understand how the value law operates in a society made of many competing capitals. What the classics show is that *the value law operates precisely through and thanks to the laws of competition*. We shall then make these laws explicit. Competition mechanisms in the Marxian tradition can be divided in two mechanisms: inter-industry competition and intra-industry competition (Guerrero, 1994).

1.2.1 Intra-industry competition

Let us first examine intra-industry competition. In capitalism, firms have to fight each other to survive in the market. Each of them looks forward to outpace other firms by conquering the largest possible market share, eliminating actual and potential threatening firms and valorizing their capitals as much as they can (Shaikh, 1982). In order to do so, they need to constantly improve their production techniques in such a way that the productivity of labor rises and, therefore, the individual value of the commodity produced is lowered. “Price and cost-cutting behavior by all firms” plays a “central role” in the classical tradition (Moudud, 2012) and the “key drive to minimize selling prices arises from the potential threat of invasion by firms outside an industry, a potential that can become an actual threat if such firms succeed in developing new technologies” (Moudud, 2010).

However, not all firms possess the same capabilities. Some are more productive than others. In each industry there is a firm that, typically as a result of its innovation process, can produce at lower costs than other competing firms that sell the same commodity and, therefore, has the capacity to set the price of the commodity that other firms will have to match in order to avoid losing market shares. This firm is referred to as the “regulating capital” (Shaikh, 2008; Tsoulfidis, 2015). If we start our analysis from a state in which all the firms have the same rate of profit and sell the same homogeneous commodity⁴², the firm that succeeds in innovating before the others (the “regulating capital”) can profit from its lower costs to make an extraordinary profit, even if it sells the commodity at a lower price than its competitors (yet not low enough to make the extraordinary profit disappear) in order to conquer a larger market share. This forces the less efficient non-innovating/less performant firms to quickly adopt the new technique so they will not run out of business. In the meantime, they are forced to sell their commodities to the regulating

⁴² Not all of the classical analyses assume the homogeneity of commodities in a market. Some authors of the classical tradition like Duménil and Lévy have even stated that “monopolistic competition is the right approach to classical competition” (Duménil & Lévy, 1993). For the sake of simplicity, we will refer here to the homogeneous commodity intra-industry competition mechanism that can be found in the ‘old’ authors belonging to the labor value branch of the Classical tradition such as Mill, Smith, Ricardo or Marx. Nonetheless, as we will explain at the end of this sub-section, when inter-industry competition is considered, not assuming the homogeneity of commodities within an industry does not alter the classical view of competition.

capital's price for their market shares not to evaporate. Therefore, since non-regulating firms possess an old and less productive production technique, selling their output to the regulating capital's value can only mean accepting a lower profit rate. This process happens continuously and, while it takes place, some firms run out of business while some others grow. At the same time, during this process some firms get higher profit rates than others according to the degree to which they have developed their techniques or their organizational skills. In Shaikh's (1982, p. 77) words:

“In any given industry, different methods of production of various ages coexist, with both differences in age method producing variations in annual profit rates. Since old methods are constantly eliminated and new ones constantly added, this intra-industrial constellation of profit rates is perpetually recreated by the dynamics of accumulation” (...) Even for regulating capitals, specific concrete factors ranging from variation in managerial abilities to sheer luck will produce a spectrum of profit rates across the individual capitals concerned”.

It is therefore the coexistence of unequally efficient production techniques in a continuous process of innovation what creates this constellation of profit rates as a result of the competitive process. Firms are considered to be heterogeneous regarding their organizational and technological capabilities and adaptation to reach the state of the art technique or to set the new state of the art technique is a constantly ongoing process. Therefore, there will always be firms 'ahead' in the cost-cutting race, while some will be always lagging behind. The length on the adaptation is a consequence of “lock-in” effects. “Large fixed capital investments 'lock in' a firm's current technology for some time, during which time its market position may be disrupted by other firms. Uncertainty about future sales, the availability of industries that would provide crucial inputs into a new technology, and recent losses, are all likely to create this 'lock-in' effect” (Moudud, 2012, p. 44).

We can appreciate how “intraindustry competition shows how a common price for homogeneous commodities finally prevails on the market, on the basis of decentralized price setting” (Duménil & Lévy, 1993). **Put in value terms, intra-industry competition is what assures that commodities will tend to be sold at their values, the mechanism that enforces the labor value law.** In Ricardo's words, “in speaking, then, of commodities, of their exchangeable value, and of the laws which regulate their relative prices, we mean always such commodities on the production of which competition operates without restraint” (Ricardo, 1913, p. 6). If we consider the evident dynamic character of the intra-industry competition process we have just explained, it becomes obvious that it describes the continuous creation and operation of forces that take time to fully operate, which leads us to conclude that the value law operates as a tendency.

1.2.2 Inter-industry competition

We shall now consider the other competition force present in the Marxian theory, inter-industry competition. Inter-industry competition is one of the pillars of the Marxian theory because it assures the (inter-industry) equalization of the rates of profit. As we will see in the next paragraph, this allows for a coherent introduction of the laws of supply and demand within the value-law based classical tradition and makes the value law possible. Moreover, as we will show during this chapter, in every competition theory the position taken regarding the equalization of profit rates has a major impact on the way in which competition is represented.

Inter-industry competition is an intuitive mechanism. Consider an industry A in which a commodity is sold at its “natural” value, meaning the value that corresponds to the socially necessary time to reproduce that commodity. Consider also that all the industries of the economy sell commodities at their values and have the same “normal” rate of profit. If, for some reason, demand for industry A’s commodity rises (diminishes) the output not having changed, its price should go up (down). In that case, the commodity will be sold at more (less) than its value. The same can be said if output is altered to an extent that it modifies the exchange value. In a first instance, it seems like the fluctuation of prices caused by fluctuations in supply and demand contradicts the value law. But it is not the case, and this is where inter-industry competition enters. If industry A’s commodity is being sold at a price higher than its natural value, industry A will enjoy an extraordinary profit compared to other industries’ profits. This will attract investment from capitalists from other industries (or expel investment to other industries in the case in which demand had diminished). Firms will enter (leave) industry A and output will increase (decrease). The variation of output will make the value of the commodity go down (up) until the extraordinary profit disappears or, analogously, until the commodity is sold at its value. **In other words, in the Marxian tradition, when firms obtain the same normal rate of profit across industries, each industry’s commodity is being sold at its value. Therefore, inter-industry competition is, along with intra-firm competition, another mechanism that enforces the law of labor value:** if a commodity is being sold above its value in an industry, inter-industry competition will attract capital to it; this increases supply and, through the law of supply and demand, forces producers to lower the value at which they sell the commodity until it reaches its “natural” value.

“This restless desire on the part of all the employers of stock to quit a less profitable for a more advantageous business has a strong tendency to equalise the rate of profit of all...(Ricardo, 1913, p. 48). Or, in Marx’s words, “Capital withdraws from a sphere with a low rate of profit and wends its way to others that yield higher profit. This constant migration, the distribution of capital between the different

spheres according to where the profit rate is rising and where it is falling, is what produces a relationship between supply and demand such that the average profit is the same in the various different spheres... ” (Marx, 2015, p. 297). Then, when intra-industry and inter-industry competition are considered together, the Marxian tradition concludes that “the dynamics of competition, rather than market imperfections, tend to reproduce unequal profit rates within industries and roughly equal profit rates between industries” (Moudud, 2010, p. 16).

It is important to clarify that it is not the average rates of profit of industries that equalize, but the rates of profit of the regulating capitals of each industry. Indeed, the latter get by definition the highest rate of profit within a certain industry. If the regulating capital’s rate of profit happens to be higher in one industry, the output in that industry will rise until the price descends up to the point in which the regulating capitals’ rates of profit tend to equalize. This happens in two ways: through an expansion of capacity utilization in the first place and through a rise in the productive capacities in the industry in the second place (Shaikh, 2008). In the latter case, “new contestants by and large aim at the most up-to-date plants or production conditions in the industry and not the outdated or the most efficient ones. The outdated production methods, other things equal, possess profitability lower than the average, whereas the most profitable methods of production may not be easily duplicated or their reproduction may entail a certain degree of risk, thereby discouraging potential new contestants. Hence, during ‘a cycle of fat and lean years’ that is, over a long period of time there is tendential equalization of inter-industry profit rates for the regulating capitals” (Tsoulfidis, 2015, p. 27).

We would like to make three important remarks before concluding the exposition of competition mechanisms in the Marxian tradition. **First, the compliance of the competitive mechanism of equalization of rates of profits depends on a key assumption, which is the absence or the fragility of barriers to entry in every industry.** While some authors like Kurz (2008) speak of absence of barriers to entry, the majority of the authors of the Marxian tradition state that barriers to entry do exist but are not persistent. The fragility of barriers to entry is explicitly assumed by many authors of the Marxian tradition (Duménil & Lévy, 1993) and some of them have also offered theoretical and empirical arguments to defend this assumption (Moudud, 2012). We will not enter into the arguments for and against the debate on the porosity of barriers to entry in this chapter. For the purpose of the current chapter, we only need to point out that in the Marxian tradition inter-industry competition is based on the porosity of barriers to entry.

Second, as with intra-industry competition, inter-industry competition is a dynamic process that takes time. Therefore, the equalization of the rate of profit and the value laws are tendencies. The equality of

profit rates can only happen in the long-run (Stigler, 1957). Supply and demand make prices oscillate around their production prices, the latter being determined by technical conditions.

Finally, there is an implicit assumption, which is that when industries' profit rates equalize through the entrance of new capitals, the new capitals are capable of producing with a technique as effective as the incumbent regulating capital that is getting an extraordinary rate of profit. In effect, if the regulating capital innovates and lowers its cost, its rate of profit rises. Then, if capitalists observe this extraordinary rate of profit and enter the industry, they must possess an equally efficient technology; otherwise, they would not be getting the attractive extraordinary rate of profit of the regulating capital but a lower one. The underlying logic is that in every industry (which in Marxian competition theory represents the smallest unit of accumulation center and is thought as led by a single firm), there is at least one regulating capital that has the technical and managerial skills required to be able to obtain the same rate of profit as the other regulating capitals from other industries.

Then, not only does inter-industry competition also enforce the value law, it makes it compatible with the laws of supply and demand as well. Inter-industry competition is clearly the most important of the two competition mechanisms of the Marxian tradition. Even if commodities are considered to be differenced among an industry and therefore intra-industry competition becomes monopolistic, the presence of inter-industry competition will assure that profit rates equalize through the entry/exit of capitals that will increase/decrease the supply, making the price go up/down. Then, as long as prices are not perfectly rigid, the degree of competition depends positively on capital mobility (inter-industry competition).

1.3 Further developments in Marxian competition theory: the administered prices and normal cost pricing theories

We have seen that in intra-industry competition the regulating capital sets the price that other less productive firms from the same industry have to adapt to in order to survive. In the “old” authors of the labor value branch of the Classical tradition, firms align their prices with the regulating capital's through a series of continuous short-run price adjustments. But, once the dominance of the big vertically integrated corporation and its administered pricing practice analyzed in the previous chapter established itself during the XXth century (cf. Chapter I), this short-run price adjustment mechanism called for a revision. **If the Marxian intra-industry competition mechanisms were to hold, further developments to show how could prices converge to the regulating capital's as a result of intra-industry competition once administered pricing had become the norm (once prices were being set ahead and**

became rigid in the short-run independently of the variations of supply and demand) were needed. Moreover, for these developments to be compatible with the Marxian tradition, they would need to comply with two of its basic theoretical assumptions we have identified in the previous subsections: the fact that barriers to entry are temporary and the fact that competitive pressures from both inside and outside the industry will tend to make similar products have similar selling prices. As we will show along this subsection, the normal cost pricing (also referred to as “full cost pricing”) and the administered pricing (also labeled “managed competition” and “target return pricing theory”) theories can be considered to be theoretical developments that go in that direction and, therefore, that we can class along the labor value branch of Classical economics developed by the Marxian tradition in terms of competition theory, as many authors belonging to the Marxian (Moudud, 2012; Shaikh, 2008) and administered prices theories (Berle & Means, 1991; Tucker, 1940) acknowledge. Consequently, when referring to competition mechanisms proper to the Marxian tradition in the conclusions of this chapter, one should bear in mind that the administered pricing and the normal cost pricing theories are considered to be part of the Marxian tradition in terms of competition theory. On the contrary, mark-up pricing, as we will argue later in this chapter, although very close to the former two theories we just mentioned in terms of their description of pricing methods (which is why these three theories are referred to as “cost-plus” theories), differs considerably regarding its underlying competition theory. Let us now describe these three theories and highlight the compatibility of the administered pricing and the normal cost pricing theories with Marxian competition theory, as summarized in Table 1.

Table 2: Major characteristics of the three cost-plus pricing theories

CATEGORY	CHARACTERISTICS	THEORIES		
		Administered pricing	Normal cost pricing	Mark-up pricing
Characteristics common to the three cost-plus pricing theories	Prices are managerially determined before transactions take place	Yes	Yes	Yes
	Prices are set as a margin above a standard cost that is calculated based on the average use of capacity over a certain period	Yes	Yes	Yes
Major differences between the three pricing mechanisms	Overhead costs are taken into account as part of the standard costs on which prices are set	Yes	Yes	No
	Prices include a target profit rate	Yes	No	No
Compatibility with Marxian competition theory	Barriers to entry are temporary and/or porous	Yes	Yes	No
	Competition forces firms to sell at the lowest possible price set by the lead firm	Yes	Yes	No

In terms of pricing theory, the administered prices, the normal cost and the mark-up pricing theories can be considered to be three versions of a single “cost-plus” theory. In these three cost-plus theories, “prices do not coordinate enterprise activities. Prices arise in the course of strategic, cooperative, and organized enterprise activities. Resulting prices do not clear markets. Nor does the market control itself and participating enterprises” (Jo, 2013, pp. 9–10). Similarly, Lavoie states that “what characterizes all these authors is the recognition that prices set by firms in the short run are not market-clearing prices, and are not even intended to be so” (Lavoie, 2014). Instead, cost-plus pricing theories make two basic assumptions that characterize them:

- i) Firms set their prices as a margin above a standard cost that is calculated based on the average use of capacity over a certain period (Andrews, 1949; Berle & Means, 1991; Hall & Hitch, 1939; Lavoie, 2014; Lee, 1999).
- ii) “Rather than having the price [of a good] determined in the process of the transaction itself, as it was for the atomistic enterprise, management determined its price prior to the transaction itself” (Lee, 1999, p. 55).

Therefore, the two basic assumptions of these three doctrines that Lavoie (2014) identifies follow:

- a) The margin of profit and the price do not vary with reasonable fluctuations in output
- b) Prices will respond to fluctuations in standard or normal costs

There are two points that allow for the division of cost-plus pricing theory into three theories. First, while “mark-up pricing does not take modifications of normal overhead costs into account” (Lavoie, 2014), normal cost and administered prices theories do. Second, the administered prices doctrine specifies that “margins added to standard costs are designed to produce the target profit rate on investment, assuming standard volume to be the long-run average rate of plant utilization” (Kaplan, Dirlam, & Lanzillotti, 1980, p. 923), while the normal costs doctrine does not include the level of investment objective there is behind normal-cost pricing. In that sense, it can be said that administered pricing constitutes a specification of normal-cost pricing (Lavoie, 2014).

Doctrines and even each authors within each doctrine differ in terms of what they consider the firm takes into account to set the level of the margin over cost. Many goals and constrains are taken into account by the firm, such as inter-temporal growth of the corporation, the degree of market competition and competitor’s prices (Berle & Means, 1991), technological innovation (Galbraith, 2015) or the strength of barriers to entry (Andrews, 1949). We will not enter into details in this subject. **What we intend to show**

in this subsection is that the pricing procedures described by two of these three cost-plus doctrines imply a notion of competition that is fully compatible with the Marxian approach and the mechanisms it describes. This compatibility comes from two propositions that both the administered prices and the normal cost doctrines (but not the mark-up doctrine) share (Moudud, 2012):

- 1) Barriers to entry are porous and/or not likely to be persistent in the long-run
- 2) Competition forces firms to sell at the lowest possible price set by the lead firm.

Regarding the first proposition, just as with Marxian theory, we will not develop here the arguments provided by the authors to justify it. For the purpose of this chapter, we should simply bear in mind that, just as the authors of the Marxian tradition do, authors of the administered prices and the normal cost doctrines consider barriers to entry to be temporary (Andrews, 1949; Hall & Hitch, 1939).

Regarding the second proposition, an examination of the two doctrines' description of pricing procedure reveals that, although there is no price competition in the short-run, price competition does take place in the long-run precisely because barriers to entry are porous and/or temporary; this makes the administered pricing and the normal cost pricing theories compatible with Marxian competition theory. The mechanism can be summarized as follows. In the normal cost and the administered prices doctrines, competition is considered to be “a series of strategic moves and counter-moves” (Lee, 1999) in which, because price is set ahead and does not fluctuate in the short-run, in the short-run, firms compete for market shares on quantities rather than on price. In fact, as we mentioned above, these authors consider that in every market “there are so few independent competitors that each has a significant degree of pricing discretion, so that setting prices becomes an active function of business administration” (Berle & Means, 1991) that results in a fixed price in the short-run. Therefore, in the short run competition focuses on “administered sales campaigns designed to alter customer goodwill, and hence market share and growth rate” (Lee, 1999, p. 57).

Nevertheless, this does not mean that prices can be set at will in a non-competitive way and that they are not subject to competition. On the contrary, price competition occurs, only that, unlike what happens in the “old” classical authors, it occurs only in the long-run. Potential competition (which, given that barriers to entry are temporary, is always a threat), government intervention and continual technical change limit the big corporation's capacity to set a high “uncompetitive” price. “Market prices would not be set where the profit margin would be above the conventional profit margin since, in the long period, it would invite

entry and thus undermine the prevailing enterprises' existence even though in the short period it would be a profitable maneuver” (Lee, 1999). Moreover, the administered prices and the normal cost doctrines describe a long-run price competition process that is very similar to the Marxian process. Indeed, constant technological progress leads to continuous reductions in the average cost of production, which makes prices go down. Firms within an industry are heterogeneous regarding their technological capacities and their organizational skills. They all take into account other firms' prices to choose the price or to adapt to the leading firm's price⁴³ (Berle & Means, 1991; Lee, 1999), so that a single price prevails (Andrews, 1949; Hall & Hitch, 1939). “If the prices in the market remain non uniform, pressure will emerge to force the prices to converge to the lowest price in the market” (Lee, 1999, p. 107). Therefore, “the essence of competition is that each seller is restricted in his pricing by the prices of his competitors” and, so, every firm “is controlled in the matter of costs and prices by the irresistible forces of the market” (Tucker, 1940, pp. 356–357). As in the Marxian tradition, this necessarily leads to differential rates of profits within an industry (Lee, 1999).

1.4 Some concluding comments regarding the Marxian competition theory and its further developments

Having presented the nature of competition and its mechanisms in the Marxian competition theory and its further developments (administered prices and normal cost pricing theories), we will now address some important features of these theories that are of major importance for our cartography.

A dynamic competition theory inside and outside the firm

One of the characteristics of the above-mentioned competition theories (but that is also present in other competition theories, as we will show further on) that has been stressed in the literature is its dynamic or behavioral essence, as opposed to the static vision of competition present in other theories such as neoclassical theory. As McNulty explains, this notion of competition was the standard view in the classical tradition even before Smith:

"[Adam Smith] incorporated into the Wealth of Nations a concept of competition already well developed in the economic literature of his time. That concept was a behavioral one, the essence of which was the

⁴³ Andrews allows for a third case in which the market price is established by a trade association. In that case, “the participating enterprises based the market price on the most efficient enterprise's normal average direct costs and then added on an agreed upon gross costing margin” (Lee, 1999, p. 12).

effort of the individual seller to under-sell, or the individual buyer to outbid, his rivals in the marketplace, and had earlier been employed and developed by a number of writers including Cantillon, Turgot, Hume, Steuart, and others, in their various efforts to explain how price was, in a free market, ultimately forced to a level which would just cover costs, that is, to the lowest level which would be sustainable over the long-run” (McNulty, 1968, p. 647).

McNulty makes evident in this quotation that competition is considered to be a behavioral notion in the classical tradition. This means that it can be said that competition is present if firms are *acting and reacting* in order to improve their situation or just survive in the market. This acting and reacting process implies rivalry. Competition is a war in which “each individual capital strives to capture the largest possible share of the market and supplant its competitors and exclude them from the market” (Marx, 1991, p. 484).

Not surprisingly, Marx uses the word “interaction” when characterizing competition. “Conceptually, competition is nothing other than the inner nature of capital, its essential character, appearing in and realized as the *reciprocal interaction* of many capitals with one another, the inner tendency as external necessity. Capital exists and can only exist as many capitals, and its self-determination therefore appears as their *reciprocal interaction with one another*” (Marx, 1993, emphasis added).

This vision represents the opposite of the static notion of competition we will address further on in this chapter, according to which competition depends on certain characteristics of the market. On the contrary, “the Marxist notion of competition defines a process, not a state” (Shaikh, 1982). Competition takes place in time, while capitals react to each other by innovating, investing, pricing, advertising, etc.

This shows that competition acts inside the firm. But competition is also the force that pushes commodities’ prices towards their respective production prices and capitals towards the industries with above average rates of profit, a force that “assures order and stability in the economic world much as does gravitation in the physical world” (McNulty, 1968, p. 643). It is therefore a force that constrains firms’ behavior. It acts both inside and outside the firm.

Competition takes place inside an industry and between industries

Regarding the fields of competition, it is obvious from the previous subsections that in the Marxian tradition competition takes place both inside the industry (intra-industry competition) and between industries (inter-industry competition). “All firms, even large-sized ones, are under competitive pressure from both within and outside the industry” (Moudud, 2012, p. 44).

Competition leads to short-run profit rate differentials within an industry

We would like to address now the relationship between the competitive process and the existence of market power asymmetries in the Marxian tradition.

In Marxian competition theory, the benchmark and the role of competition is that commodities are sold at their values. This, added to an acknowledgement of the dynamic essence of competition, the recognition of a differential of capabilities between firms and the assumption of “porous” barriers to entry, is what explains that Marxian competition theory allows for short-run profit rate differentials between firms of the same industry. Nonetheless, contrary to what happens in most of competition theories, these profit rate differentials are not the result of market power asymmetries but, on the contrary, of competition acting.

As we have seen, intra-industry competition describes the mechanisms through which a single (lowest) price, the regulating capital's, prevails in the market. In the classical labor value theory tradition this price can be considered to represent the value of the commodity. As Ricardo puts it, “in speaking, then, of commodities, of their exchangeable value, and of the laws which regulate their relative prices, we mean always such commodities on the production of which competition operates without restraint.” (Ricardo, 1913, p. 6). But, as we saw, firms are considered to be heterogeneous regarding their technological and organizational capacities. There are regulating capitals that set the lowest possible price and less efficient capitals that have to adapt to that price even if their costs are higher. Therefore, short-run differentials in rates of profit exist *within* an industry. On the contrary, inter-industry rates of profit tend to converge. Barriers to entry are temporary and capital flows from one industry to the other seeking the highest possible rate of profit. Excesses and lack of supply tend to equalize rates of profits among industries because of inter-industry competition.

Therefore, the disparity of rates of profit between industries is only temporary (Stigler, 1957). Barriers to entry being porous, these rates of profit tend to equalize just as the price of a commodity tends to its value over time although it may never reach it (Marx, 2015; Moudud, 2012; Ricardo, 1913). On the contrary, short-run profit rate differentials always exist within an industry (Duménil & Lévy, 1996; Moudud, 2012; Shaikh, 1982). There is no competitive force that leads to an equalization of rates of profit in this case. The nature of dynamic competition in a landscape of heterogeneous firms struggling to cut their costs by innovating leads to a continuous process in which the regulating capital manages to lower its cost and its selling price and obtains a profit rate above the other firms'. “In all of this there can never be any guarantee for any individual capital that it will earn any profit at all, let alone the social average rate of profit” (Shaikh, 1982). The distinction between regulating capitals and non-regulating capitals being just

a polar case, we can think of various categories of firms according their differentials in technical and organizational skills. Then, Marxian competition theory allows for the existence of a “constellation of profit rates” (Shaikh, 1982) within an industry not doomed to disappear while it invalidates the existence of a long-run profit rate differentials between industries. This constellation of profit rates is the result of intra-industry competition acting and not an expression of market power asymmetries.

2 Neoclassical competition theories

In this section we will analyze what we will hereafter refer to as **neoclassical competition theories**. **This umbrella term, which takes many meanings depending on the author, will be used to refer to competition theories that hold that, if markets respect certain characteristics** (atomicity, ‘free’ entrance and exit from the market, free movement of production factors, homogeneousness of goods and/or optimal repartition of property rights, as we will show along the section), **the rational behavior of agents** (i.e. the fact that agents use available information in the best possible way to optimize their behavior) **will result in a competitive state in which no agent will influence prices or quantities in a market in its favor in such a way that departs from the social optimum**. As we will see, the conditions markets have to respect for rational agents to behave in such a manner have evolved, leading to different neoclassical theories that share this common trait. Since the appearance of the concept of perfect competition, the Chicago School and Modern Property Rights Theory have redefined these conditions. Therefore, this section will develop the contributions of each of these theories to the neoclassical concept of competition.

The neoclassical concept of competition can be pictured as the exact opposite of the branch of the Classical approach that centered on labor value theory analyzed in the previous section. The first version of the neoclassical economics, general equilibrium theory and the perfect competition paradigm, which was born with the Marginalist revolution in the XIX century, departed from the above-mentioned branch of Classical economics core concepts, developments and research program. They developed a completely different economic theory that aims to argue that ‘free’ markets are the most efficient possible way of organizing production based on a conceptual framework that confronts this branch of the Classical tradition in almost every aspect. In this subsection we will focus on one of its building blocks: competition theory.

As we did with the classical theory, we need to understand the role competition plays in the neoclassical theoretical analysis of the economy as a whole in order to fully comprehend it. Therefore, before

analyzing the neoclassical concept of competition we need to briefly recall the main aspects of the theory of the firm and equilibrium on which its first version, perfect competition, relies. Just as we did with the classical theory, we will outline the main points of the neoclassical theory that we will be needed to analyze the concept of competition without entering into details, debates or subtleties. Our exposition should be considered a sketch that will serve as an input for the ultimate goal of this chapter, which is the creation of a critical cartography of competition theories.

2.1 Efficient equilibrium and the firm in general equilibrium theory

General equilibrium theory considers the economy is constituted by independent firms that seek to maximize their profits and rely on three factors of production to produce: labor, capital and land. Each of these factors has a productivity that is supposed to be marginally decreasing. The firm's technique refers to the way in which it combines in different proportions these factors. All firms are supposed to choose the state of the art technique, i.e. the one that allows for the production of a unit of output with the smallest possible cost.

This, in turn, is nothing but the result of two of the key assumptions of neoclassical theory: rationality and perfect information. This implies that all firms can freely and immediately access all the relevant information (perfect information) and use it the best possible way to optimize their behavior (rationality). Therefore, they can choose the technique (combinations of production factors) that, according to the current market prices of factors and technology, maximizes their profits. The latter being supposed to be equal to merely a combination of factors equally accessible in the market to every firm, it follows that all the firms will choose the optimum technique. Then, contrary to what the classical theory assumes, firms are homogeneous regarding their capabilities, which is why neoclassical models represent them all as a single "representative firm". The homogeneity of firms follows from the assumption of perfect rationality in a "competitive" market environment. Now we need to understand what "competitive" means in neoclassical competition theory.

Factors' prices are 'freely' (we will come back to this later) determined by the factors' markets and cannot be influenced by the firm that acquires them. In every market, including the one in which they sell their output, firms are price-takers. The firm's cost depends therefore on the choice of technique (how many of each factor is used to produce a unit of output) and the factors' prices. All the firms will therefore choose the same optimal technique that minimizes the cost of the production of a unit of output according to the factors' prices.

As long as the firm's output price is above its production cost, the firm will choose to use more factors in order to produce more and, so, increase its profit. But since productivity is assumed to be marginally decreasing, every additional factor will render a profit smaller than the one that had been previously added. Therefore, at some point the addition of a unit of a factor will render a marginal revenue smaller than its cost. At this point, it would not be convenient to continue expanding production. Then, firms have to compare marginal revenues with marginal costs and produce the amount of output for which, under the state of the art/cost-minimizing technique all the firms share, the marginal revenue of producing an extra unit of output (the output's price) is equal to its marginal cost, i.e. the cost of the extra factors needed to produce an additional unit of output. If we aggregate all the firms in the market, we can obtain a market supply curve in which price/marginal cost is positively related to the level of output.

Symmetrically, consumers experience marginally decreasing utility while consuming a good: each unit consumed brings more utility, but the utility added by each unit is smaller than the one added by the previous unit consumed. Consumers will be willing to buy an additional unit of the firm's output as long as its price is equal to or smaller than the satisfaction its consumption (which is supposed to be measurable in monetary units) brings. Therefore, since their marginal utility decreases with the amount of units consumed, consumers face a negative relation between output and the price they are willing to pay. This can be represented as the demand curve.

When supply equals demand, consumers are paying the maximum they are willing to pay for the last unit consumed and firms are maximizing their profits. The resulting level of output and price/marginal cost is considered to be efficient for both firms and consumers, i.e. for the society as a whole. It is considered to be a point of allocative efficiency, i.e. a point in which consumers pay a price that is equal to the marginal cost of production of the last unit. It is therefore the minimum possible price they can pay if firms are supposed to rationally choose their level of production in order to maximize profit. Then, at this point of "allocative efficiency", consumers' utility and firms' profits are maximized. The later can only be possible if the good is produced at the lowest average total cost possible.

This ideal point of social efficiency is nonetheless possible only when "perfect" competition exists. There are underlying assumptions that make the mechanisms we have just described possible. We shall then explore in the following sub-section the meaning of perfect competition.

2.2 Perfect competition

As we saw, the general-equilibrium-rooted neoclassical theory argument for the social efficiency of the equilibrium between supply and demand relies on some key assumptions:

- i) Consumers face marginally decreasing utility when consuming a good
- ii) Firms face marginally decreasing or constant productivity (Arrow & Hahn, 1971)
- iii) Firms are price-takers

The first condition, although it has been discussed in the literature (Kauder, 2015), does not interest us in order to comprehend the meaning of perfect competition. The second condition, even if unrealistic and criticized in the literature, has a direct effect on the competitive process, but we will refer to it later in this section in relation to the third condition. We will focus on the latter, since it is the underlying specific assumptions that neoclassical theory gives to it what shapes the concept of perfect competition and neoclassical competition theory in general.

Firms being price-takers means much more than what it seems in perfect competition theory. As McNulty shows, it is with neoclassical economics that the idea of competition as a market structure emerges (McNulty, 1968). Following McNulty, we can trace the development of this idea of competition to Cournot, who wrote that competition “had reached their limit when the output of each firm was ‘inappreciable’ with respect to total industry output, and could be subtracted from the total output "without any appreciable variation resulting in the price of the commodity" (Mill, 1973, p. 306). Later on, Jevons and Edgeworth in the late nineteenth century, with the subsequent refinements of J.B. Clark and Frank Knight, the marriage between competition and market structure in the way the current concept of perfect competition took place.

The underlying idea of perfect competition is that, for firms to be price-takers, they need to have a negligible influence on each other and on the market in which they participate. As Stigler puts it, market competition can be defined as “the absence of monopoly power in a market” (Stigler, 1957). This implies that "the trader submits to the market prices without deliberately trying to modify them. These prices are effectively modified by his supply and demand, but unwillingly. It is what characterizes the state that we shall name free competition" (Pareto, 1964, p. 90)⁴⁴. This is formalized by Marshall’s introduction of Cournot’s horizontal demand curve firms face in the third edition of his *Principles* (Marshall, 2009). The meaning of this curve is the same: individual increases of output have no effect on market price.

The conditions for this lack of market power are assimilated to a particular market structure in perfect competition theory. In particular, each firm’s output should be negligible compared to the total output

⁴⁴ The translation is ours.

(Marshall, 2009). If we examine the conditions of perfect competition or of equilibrium efficiency that refer to competition, we can find the following ones:

- i) Atomicity of the market: there are “indefinitely large numbers of participants on both sides of the market” (Stigler, 1957) (Arrow & Hahn, 1971; Edgeworth, 1881).
- ii) Free entrance and exit from the market: there are no costs associated to the entrance/exit to/from the market (Arrow & Hahn, 1971; Knight, 2012)
- iii) Free movement of production factors: there are no costs associated to movements or changes, neither regarding the acquisition of production factors
- iv) Goods are homogeneous

These conditions constitute the core of the concept of perfect competition. When they are met, competition is perfect in the sense that *no firm will have any influence over the market price*. This (neoclassical) interpretation of the lack of market power is to us what constitutes the core of the neoclassical concept of competition. Moreover, the latter is identified with a certain market structure: the market has to be made of many equally uninfluential firms that have no power whatsoever over price and quantities. This particular market structure, in turn, is nothing but the result of these four conditions being met and the previously mentioned assumption of decreasing marginal productivity of factors. Indeed, if there is decreasing marginal productivity of factors and conditions ii) iii) and iv) are met, the market will be atomistic (condition i) will be met) and firms will be powerless regarding their capacity to influence the market price. On the contrary, if marginal productivity increased with output, the firm will find optimal to produce all the output demand can absorb, since marginal costs would always be above marginal gains. The result would be a monopoly. Therefore, in the perfect competition framework, the shape of the technically determined cost function explains the market structure, which in turn explains firms’ competitive behaviors. In Coriat’s and Weinstein’s (2015, p. 15) words , “the nature of the variables that it [the neoclassical firm] can manipulate (its policies) is determined by the market structure that is imposed to it”⁴⁵.

Regarding condition iv), if goods are not homogeneous, a firm could have the monopoly of a market defined by the good of which it is the only produces. Finally, even in the case of a monopoly, if barriers to entry do not exist or are temporary (an access to a particular resource reserved to a particular firm can thought of as a barrier to entry), the monopoly could be easily threatened and forced to practice “competitive” prices. Therefore, condition ii) is a key assumptions of the perfect competition theory. As

⁴⁵ The translation is ours.

we will show in the following subsection, neoclassical economics had to rethink condition ii) in order to make its own benchmark and definition of competition (the impossibility for any firm of setting prices above the “competitive” level) compatible with the evident existence of market concentration (violation of condition i)). This is what the authors from the Chicago School did by developing the notion of contestable markets, as we shall see in the next subsection.

2.3 The Chicago School and the notion of contestable markets

Cournot, the father of the neoclassical concept of competition, did not pay much attention to conditions of entry in an industry. Therefore, a market with numerous firms with similar market shares in which the entry was impossible should be considered to be competitive in Cournot’s terms (Stigler, 1957). In fact, perfect competition theory studied intra-industry competition without taking a particular interest in the “openness” of a market to potential entrants. This changed when scholars from the Chicago School such as Posner, Stigler, Baumol or Panzar, among others, developed the concept of contestable markets. This theoretical development refined neoclassical competition theory and became a major theoretical background for antitrust policy in the United States during the 1970s and the 1980s (Souty, 1995), as evoked in Chapter I.

The Chicago School arose in the 1970s as a neoclassical alternative to the conclusions of the Harvard or Structuralist School. We will address the latter in more detail in the following subsection. For the time being, we can say that, in a nutshell, Harvard School’s competition theory is based on the following two propositions (Souty, 1995).

- i) Structure Conduct Performance (SCP) paradigm: market structures determine firms’ behaviors. In that sense, the more concentrated a market is, the more market power firms will have and exert and, therefore, the market will perform worst in terms of efficiency.
- ii) Market power (i.e. the capacity to set prices above the competitive level) is inherently damaging in terms of economic efficiency and should therefore be banned *per se*.

We can see that while the Harvard School shares the ideas that market structure defines firms’ behavior with perfect competition theory, unlike the latter, it considers anti-competitive concentrated market structures to be *a result* of the competitive process. That means that competition eventually leads to its self-destruction: concentrated market structures that result in anti-competitive behaviors and, therefore, inefficient performances.

Harvard School's competition theory had been the cornerstone of American antitrust during the Fordist competition era (circa 1945 to 1970s). Guided by the ideas according to which market structures heavily influence firms' behaviors (SCP paradigm) and competition leads eventually to market power, American antitrust and regulators applied many restrictive measures to assure that market structures would not give market power to firms (cf. Chapter I). When, during the 1980s, a process of deregulation started to take place in the United States (notably in the telecommunications and airline industries), these measures started to be relaxed. Through the lenses of the Harvard School, this implied augmenting firms' market power and, therefore, giving them the power to raise prices. In this context, and in order to justify the benign competitive outcomes that should arise from deregulation, The Chicago School developed the notion of "contestable market", which would reconcile the overwhelming empirical evidence of the dominance of concentrated market structures with the idea that competition in the neoclassical sense of the term still prevails, something that the Harvard School thought to be impossible. In order to do so, it rejected the SCP paradigm (proposition ii) while keeping the neoclassical competition theory framework, especially its conception of competition as a market structure that does not give firms market power, the latter being understood as the capacity to raise prices over the competitive level (proposition i). The Chicago School defied the SCP paradigm with the notion of "contestable market", which became its definition of a competitive market. Baumol (1986, p. 3) defined the later in the following way:

"A contestable market is one into which entry is absolutely free, and exit is absolutely costless. We use 'freedom of entry' in Stigler's sense, not to mean that it is costless or easy, but that the entrant suffers no disadvantage in terms of production technique or perceived product quality relative to the incumbent, and that potential entrants find it appropriate to evaluate the profitability of entry in terms of the incumbent firms' pre-entry prices. In short, it is a requirement of contestability that there be no cost discrimination against entrants. Absolute freedom of exit, to us, is one way to guarantee freedom of entry. By this we mean that any firm can leave without impediment, and in the process of departure can recoup any costs incurred in the entry process."

The strength of contestable markets as a theoretical tool to refine the neoclassical concept of perfect competition is major. As long as a market is contestable, no matter how concentrated it is, it will be competitive and, therefore, it will also be efficient if other conditions relative to the characteristics of the markets⁴⁶ are met. The incumbent firm will keep its price at the competitive level (it will not *exert* its market power, although it may have some) to avoid attracting potential entrants. Since it is obvious that no entrance and no exit from a market is ever costless, the Chicago School redefined that notion so

⁴⁶ Namely perfect information and complete divisibility of goods.

“costless entry or exit” would mean “*relatively* costless entry or exit”: firms can face a cost of entry or exit, but no firm should face a higher cost than others’.

The impact of these refinements was of paramount importance for neoclassical competition theory⁴⁷. **The neoclassical *notion* of competition (i.e. a competitive market is a market that possess characteristics that guarantees that firms will not set prices above the competitive level) was kept by changing the *condition* of competition. Market concentration (which in turn depends on the technically determined cost function, as we mentioned above) is not a source of (un)competitive conditions anymore. Equal costs of entry and exit become the *only* condition of competition. Therefore, the concept of contestable markets reconciled concentrated market structures with the neoclassical notion of competition and, more importantly, with the *prevalence* of competition.** Even in the extreme case of a monopoly, as long as there is a threat of new firms entering the market, competition would prevail and prices would be the same as those of perfect competition. We will now take a deeper look into the prevalence of competition in neoclassical competition theory and other aspects we wish to analyze before concluding this subsection.

Before closing this subsection, we would like to refer quickly to Chicago School’s position regarding (semi)vertical market power. Another of the main differences this school of thought presents in terms of competition theory with perfect competition theory is the consideration of vertical relationships between firms. The Chicago School has dealt with vertical relationships mainly by treating the issue of vertical restraints, i.e. contractual arrangements between producers and retailers such as the imposition of a re-sale price, exclusive sales, exclusive territories or tied sales. The position of this school is that “vertical restraints do not support the transmission of monopoly power from one level to another” (Dobson & Waterson, 1996), as the work of some of the most prominent authors of the Chicago School such as Bork (1979; 1966), Telser (1960) and Posner (1981, 2014) argues. Their position regarding the existence of market power in these cases can be considered to be an answer to the Harvard School’s stand, which is the opposite. While the Harvard School tends to see in these practices the exertion of market power from one firm to its immediate buyer/seller firm, the Chicago School usually sees arrangements that allow for the increase of efficiency when externalities are present (Encaoua, 2015). Indeed, the main argument of the Chicago School relies on the fact that in vertical relationships goods sold by the upstream and the downstream firms are complementary (since both firms need each other to operate) and not substitute as it is the case in horizontal competition between firms competing in the same market. Then, contrary to what

⁴⁷ The impact is not only theoretical. As shown in Chapter I, antitrust policy, especially in the United States, underwent a major shift partially as a consequence of the influence of the Chicago School literature on competition theory.

happens with substitute goods, a price cut by a firm creates incentives for the other downstream firm to increase its demand for the good. This is an externality that the price-cutting company will normally not take into account. But if vertical agreements exist, firms will internalize this effect and therefore will have an incentive to cut prices and not to exert market power on the downstream firm (Verouden, 2008). Then, monopoly rents can only exist in horizontal competition. When it comes to vertical competition between upstream and downstream firms, vertical agreements “do not allow for additional monopoly rent to be created” (Dobson & Waterson, 1996, p. 1).

2.4 Modern property rights theory and incomplete contracts

Modern property rights theory (MPRT) can be considered to be a variation of neoclassical theory in terms of competition theory in that, just like perfect competition theory and the Chicago School, it argues that, if markets respect certain characteristics, rational agents’ interactions in the market will lead to a competitive state in which none will set prices and/or quantities in the market in such a way that departs from the social optimum. In order to complete the analysis of neoclassical theories, this section will show how the link between competition and market power is addressed by MPRT through the notion of incomplete contracts, which redefines the conditions of a competitive state in the sense we just have given to the term by introducing the problem of the repartition of property rights.

We have just seen how, using the notion of contestable markets, the Chicago School redefined the benchmark of competition to conclude, along with the perfect competition framework, that, under certain conditions that make a market competitive (free entry in the case of contestable markets), market power will not emerge. In the same manner, MPRT integrates the problem of the distribution of property rights and concludes that a right distribution of property rights is another necessary condition for market power not to arise.

MPRT conceives the problem of incomplete contracts as an ex-post difficulty firms and individuals face after having signed a contract for a transaction (Chassagnon, 2009). According to this theory, an engagement can only be translated into a contract if it is checkable by a third party (a judge for example). However, most of the times it is not the case. Outcomes are not necessarily observable, which makes contract incompleteness possible even when information is symmetrical and agents are rational. Then, when an agent invests in a specific asset (an asset that has more value in the transaction for which the investment was made than if used for other transactions), given the existence of incomplete contracts, the hold-up problem appears.

In MPRT the firm is conceived as a set of assets subject to the same authority and a unified control (Blair & Stout, 1999). Control, in turn, is assimilated to property rights: whoever possesses an asset has residual control rights over it, i.e. the right to decide on the use and the exclusion from the use of the asset in the terms stipulated by legal rules. Since employees have asset-specific skills (for example, the ability to use a particular software), authority from the owners of those assets in the firm can be exerted to coordinate labor. Consequently, the firm is nothing but a “nexus of contracts” (Jensen & Meckling, 1976) indistinguishable from the market. The boundaries of the firm are ultimately defined by the risk of hold-up. When a circumstance that is not contemplated in a contract that involves a previous investment on a specific asset by agent A occurs, agent B can benefit from the situation. In this case, there is a risk of hold-up. Agent B can act opportunistically by threatening not to fulfill the transaction if it is not carried in a way that is more beneficial to it since the specificity of agent A’s investment makes agent A *dependent* on B. Intra-firm coordination is the solution to the problem of hold-up. If both agents were part of the same firm, none would not gain from being opportunistic or by holding-up the other. Then, when there is a high risk of hold-up, market transactions will be replaced by within-the-firm transactions in which de jure power (the legal power to decide on the use and the exclusion from a resource) becomes the coordination mechanism. Consequently, MPRT concludes that “ownership is a source of power when contracts are incomplete” (Hart, 1995, p. 29).

In respect to competition theory, we can appreciate that **one of the major consequences of the analysis of incomplete contracts made by MPRT is that there is an optimal distribution of property rights that annuls the possibility of hold-up and, therefore, of market power asymmetries between firms. In other words, as long as property rights are properly defined (and it is in the interest of rational agents that internalize in the firm transactions that require large specific investments), competition will not lead to market power.**

2.5 Some concluding comments regarding neoclassical competition theories

We would like to address now some important features of neoclassical competition theory that are of major importance for our cartography.

The first thing we will like to point out is the static conception of competition in neoclassical economics. Unlike the classical tradition, neoclassical economics sees competition as a state and not as a process. Competition is not behavioral and dynamic but rather a state of affairs. If we consider the perfect competition framework, competition is defined as a particular state of market structure that makes firms unable to set prices above the competitive level. If we consider the contestable markets framework,

competition is defined as a state in which the costs of entry and exit are the same for all the firms, which makes the incumbent firms not to wish to set prices above the competitive level. In the case of MPRT, competition implies a proper distribution of property rights. In every case competition is not identified, as it was the case with the Marxian tradition, with “a series of strategic moves and counter-moves” (Lee, 1999) between firms reacting one to each other, i.e. a process. On the contrary, competition is in neoclassical economics a situation. Since competition is a static and non-behavioral concept in neoclassical theory, it only operates in the market but not inside the firm. Competition is reduced to certain characteristics of the market on which competitive behavior depends.

Regarding the field of competition, neoclassical economics is split depending on what version is to be considered. The perfect competition framework focuses on intra-industry competition, the existence of free entrance and exit being assumed. On the contrary, the contestable markets framework makes of relatively costless entrance and exit from the market a condition of competition and therefore one of the fields on which it takes place. Moreover, in this framework intra-industry competition can only happen if inter-industry competition takes place: the two fields are deeply interconnected. Modern Property Rights Theory, in turn, applies its analysis of the hold-up problem both to transactions between two competitors in the same market and to firms engaged in a direct supplier/client relations within a supply chain.

Finally, we would like to address an important feature of neoclassical competition theory that distinguishes it from neighboring theories such as the Harvard School’s: the relationship between competition and market power asymmetries. In neoclassical competition theory, competition leads to the annulment of market power. In the perfect competition framework, competition can never lead to exertion (not even to the appearance) of market power by firms that would set prices above the competitive level. A market with all the basic competitive features will automatically lead to a situation in which firms will not have any market power. This, of course, does not mean that uncompetitive situations cannot take place. Agents can collude, the government could set uneven barriers to entry, agents could possess imperfect and/or asymmetrical information, etc. What we want to stress is that, **in the perfect competition framework, competition will not lead to market power asymmetries by itself. The latter can only exist if uncompetitive external forces act, but not as a result of competition.** That is to say, the market power paradox is not verified. If we consider the Chicago School competition theory, the same conclusion is to be drawn. Regarding horizontal competition, a contestable market, as long as no external uncompetitive forces interfere (a firm wishing to set an uncompetitive barrier to entry to prevent a particular firm to enter the market, unequal public regulations on the entry or the exit of the market, etc.), will remain competitive and, therefore, will not allow for market power asymmetries. Although in a competitive state some firms can *possess* market power, as long as competition takes place (as long as the

market is contestable), they will not use it and no market power asymmetry leading to long-run profit rate differentials will exist. The same can be concluded for MPRT: if property rights are properly distributed, market power asymmetries cannot arise and, therefore, competition does not lead to long-run profit rate differentials between firms.

Regarding vertical competition, we have seen that for the Chicago School (the perfect competition framework does not analyze vertical competition) vertical agreements do not allow for the transmission of monopoly rents and, on the contrary, stimulate constant price cuts (they foster competition). In that sense, we can say that vertical competition does not lead to market power asymmetries.

In the perfect competition, the MPRT and the contestable markets frameworks, the social role of competition is preserved: competition always leads by itself to the biggest possible efficiency for both consumers and producers. This is the conclusion to which all the variants of neoclassical competition theory try to arrive.

3 Imperfect Competition and Monopoly Capital theories

At the beginning of the XXth century, two schools of thought (Monopoly Capital Marxism⁴⁸ and what we will label the “imperfect competition” tradition) departed from what up to the moment had been the standard view in their theoretical traditions: the labor value branch of Classical competition theory and perfect competition, respectively. In both cases, what spurred their contributions to competition theory were the new industrial organization landscape that, as shown in Chapter I, by the turn of the century had become dominant in developed economies: the large vertically integrated corporation, administered prices, cartels and trusts, among others. In both cases, the new competition landscape seemed to be difficult to fit the theoretical frameworks they had in mind. In both cases, then, new competition theories emerged as an answer. In this section we will examine the particularities of these theories in the light of the reading grid that guides this chapter and we will show how their mutual evolution from Classical competition theory and perfect competition theory gave birth to a common understanding of competition and its link with market power. Let us start with Monopoly Capital Theory.

⁴⁸ We include some authors belonging to the dependence theory in Monopoly Capital Theory category. Indeed, a branch of dependence theory (Andre Gunder Frank, 1966; Marini, 1977a; Santos, 1970) came from Monopoly Capital Theory (Palma, 1987). At some stage of their theoretical constructions, authors belonging to the former resorted to (although not exclusively), “parasitism” explanations of dependency of peripheral countries on metropolises that, in some cases, referred to Monopoly Capital Theory’s competition mechanisms.

3.1 Monopoly Capital competition theory

Monopoly Capital Theory can be thought as Marxism's theoretical reaction to the overwhelming and increasing importance of economic practices that seemed to go against what was usually understood as "competitive". On one side, administered pricing seemed to undermine the major role competition on prices (the battleground of intra-industry competition in the classical tradition) plays in Marxist competition theory. On the other side, the colossal size of corporations that resulted from historically increasing concentration and centralization of capital (in many cases brought about by trusts, cartels and other forms of ententes between firms of the same industry) put at risk the assumption of perfect mobility of capital between industries, which, as we saw, is the cornerstone of inter-industry competition in the classical tradition.

The first author of the Marxist tradition to notice this was Lafarge, who concluded that the death of competition was approaching:

" (...) we will see this competition, condition of every production, every trade and all the capitalist moral, self-destroy and constitute by its own game capitalist centralization, which results fatally in the organization of industry in trusts, which suppress competition in an equally efficient way as corporatist organization does" (Lafargue, 1903) ⁴⁹.

Nevertheless, not all the authors of the Monopoly Capital tradition share the view of competition being extinguished. Baran and Sweezy, for example, argue that with monopoly capital, although price competition disappears, competition "takes new forms and rages on with ever increasing intensity" (Baran & Sweezy, 1968, p. 67). But the debate on the degree of prevalence of competition is not what interests us for the purposes of our cartography. We would like to begin by stressing a common agreement within Monopoly Capital Theory, which is its argument according to which *monopoly capital emerges from competition* (Hilferding, 1985). In every author belonging to this tradition we find the idea (explicit or not) that the competition laws that Marx enounced a century before them were valid during the competitive phase of capitalism and that, if developed, they can only (theoretically and historically) evolve toward monopoly capital.

The first author to explain this, and on which all the tradition of monopoly capital stands, was Hilferding (1985). Following Marx's own reasoning when he developed the law of the tendency of the rate of profit

⁴⁹ The translation is ours.

to fall in *Capital*, Hilferding argued that the very same laws of classical competition that show how firms need to constantly improve their technological capabilities to reduce costs and survive the competitive struggle “also brings about a change in the component elements of constant capital” (Hilferding, 1985, p. 183). More precisely, this change requires more constant and fixed capital. This makes industries more and more difficult to enter and to exit. It is worth to quote Hilferding’s full and clear account of the latter:

“This enormous inflation of fixed capital means, however, that once capital has been invested, its transfer from one sphere to other becomes increasingly difficult. Circulating capital is reconverted into money at the expiration of each turnover period, and can then be invested in any other branch of production; but fixed capital is tied up in the production process through a whole series of turnover periods (...) The larger the fixed capital, the greater weight in the balance of investments, and the larger its proportion in relation to the total capital, the more difficult it becomes to realize the value embodied in it without very considerable losses, and to transfer it to a more advantageous sphere. This circumstance modifies the competition between capitals for investment outlets emerged which limit the mobility of capital, although admittedly they only affect the capital which has already been transformed into means of production, not the capital which still awaits investment. A second limitation consists in the fact that technical progress expands the scale of production, and that the increasing volume of constant capital, especially fixed capital, requires an ever greater absolute sum of capital in order to expand production itself on a corresponding scale or to establish new enterprises. The sums which are gradually accumulated from surplus value are far from adequate to be transformed into independent capitals. It is conceivable, therefore, that the influx of new capital is insufficient or arrives too late” (Hilferding, 1985, p. 186).

Following the same line of reasoning, Baran and Sweezy add other factors to the difficulty of capital mobility. In their view, in the “monopolistic and oligopolistic industry” (i.e. the industries that require investments that are so important that only one or a few firms in a market can afford), “the amount of capital required for the establishment of a new firm assumes prodigious proportions. Not only are the present standards of technology (such as to render the erection of a modern, scientifically adequate plant) very expensive, but the initial outlays on advertising, sales-promotion campaigns, and so-forth, that have to be met by a new firm call for large amounts of investment. What is more, the largely ephemeral nature of the initially acquired ‘asset’ (goodwill, market connections, etc.) greatly increases the riskiness of the new product. It becomes thus entirely inaccessible to small businessmen or even group of businessmen (corporations) neither themselves endowed with the requisite funds nor able to obtain sufficient support from the capital market” (...) “The extraordinary difficulty, if not impossibility, to entry of new firms into monopolistic and oligopolistic industries endows the established monopolies and oligopolies with what might be called ‘privileged sanctuaries’. The rules of behavior in the relative tranquility and security of

these retreats are, however, quite different from those applicable to industries exposed to the sharp winds of competition” (Baran & Sweezy, 1968, pp. 196–197).

The major implications of these new “rules of behavior” are fully assumed by the authors of Monopoly Capital Theory. Hilferding (1985, p. 186) points out that “the free movement of capital, however, is a necessary condition for the establishment of an equal rate of profit. This equality is violated whenever the ebb and flow of capital is impeded in any way”. Then, during the “monopolistic phase of capitalism”, contrary to what happens in competitive industries, “in the monopolistic and oligopolistic sphere of the economy rates of profit on invested capital are unequal but predominantly high” (Hilferding, 1985, p. 207). These theoretical developments of the labor value branch of Classical competition theory put the finger on its sensitive spots: if free mobility of capital between industries (the mechanism of inter-industry competition that, we recall, is the central one in this branch of Classical competition theory) is swept away, competition as the authors belonging to this tradition understood it is dead, and so the equalization of profit rates and the labor value law (Kornblihtt, 2008). Needless to stress the importance this conclusion has for the Marxian tradition.

The resulting mechanisms of competition theory, although rooted in the labor value branch of Classical Theory, are quite different the ones we exposed in the previous section. To sum up, concentration and centralization, two theoretical and historical necessary outcomes of Marxian competition laws, as well as the increasing importance of other variables of competition (goodwill, “technological rents” -Mandel, 1999, p. 317-), considerably restricted capital mobility in the age of monopolistic capitalism. As a result, price-competition ceased to exist. The latter is a conclusion held by Lafargue, Hilferding, Bujarin, Baran and Sweezy (Kornblihtt, 2008). As a result, firms in oligopolistic and monopolistic industries benefit from “surplus-profits” (Mandel, 1999, p. 317) that can be achieved “primarily by raising prices once they are in a position to eliminate competition” (Hilferding, 1985, p. 227). “Monopoly prices” (Dobb, 1975) are then the usual practice and competition, if it can be considered to exist (as we said before, the view on this point is not homogeneous among authors) is rather based on fights between oligopolies on market shares through advertising and sales effort (Baran & Sweezy, 1968; Hilferding, 1985), i.e. intra-industry competition on quantities. Similarly, the authors’ views on technological competition are not consensual. While some authors argue that under monopolistic and oligopolistic competition cost-cutting innovations are still constantly introduced in order to increase profit rates (Baran & Sweezy, 1968; Mandel, 1999) others see monopoly capital as a cause of the stagnation of innovation and capitalism in general (Hilferding, 1985). **In any case, competitive mechanisms do not rely anymore on placing capital in the most profitable industries (until extraordinary profits disappear) and trying to cut costs by innovating in order to obtain (temporary) extraordinary profits. In Monopoly Capital competition**

theory, the increasing needs of fixed capital and the evolution of the technology needed to produce at an efficient level lead inevitably to firms holding and exerting market power and obtaining long-run extraordinary profits.

3.2 Imperfect competition theories: the Harvard School's and mark-up pricing theories

In the early 1930s, the “imperfect competition” approach started to develop with Chamberlin’s “Theory of monopolistic competition” (1948) and Joan Robinson’s (1969) (1969) foundational works. These authors identified for the first time “intermediate categories in between purely competitive and monopolistic markets” (Galbraith, 1956, p. 60) that seemed to describe in a more realistic way the concentrated markets characterized by price-fixing corporations that dominated the economic landscape at the beginning of the XXth century. In this subsection, we will outline the main characteristics of this approach in order to see how it answers the market power paradox and our reading grid. In this sense, we will limit the discussion to the main basic contributions of some of the most relevant authors of this tradition.

The heart of the imperfect competition tradition lies in two points:

- a) The SCP paradigm: “By affecting the character and intensity of competition among firms in the same industry, market structure shapes their conduct and performance” (Bain, 1968, p. 27).

- b) Competition takes place in markets that are not perfect in the sense that neoclassical theory gave to that term (see subsection 2.2), which alters the neoclassical conclusions on pricing and market power, among others.

The latter gave name to the industrial organization paradigm that was identified for decades as Harvard School’s, and of which Bain became the main contributor, the “Structure conduct performance” (SCP) paradigm⁵⁰. Market structures were classified according to three interrelated characteristics: the degree of seller concentration, the extent of product differentiation and the condition of entry to the industry (Bain,

⁵⁰ Monopolistic competition theory and Harvard School’s imperfect competition theories are in fact very close to each other (Cayla, 2001; Samuelson, 1967). In terms of our analysis they can be considered to constitute a single competition theory in which monopolistic competition is a particular case of imperfect competition in the sense that monopolistic competition explores the ultimate consequences in terms of competition theory of one of the characteristics that make a market imperfect: product differentiation (Cayla, 2001).

1968). Although authors belonging to this tradition do not always agree on which of these characteristics of market structures is/are the one(s) that defines imperfect competition or even on the distinctions made between these three characteristics⁵¹, they all agree on the fact that at least one of them differs from its neoclassical characterization, which has effects on the way competition takes place and market power is created.

Concentration is conceived as the almost inevitable outcome of the characteristics of markets that will shape firms' behaviors. In particular, Bain (1968) identified the following conditions as necessary for a market not to be concentrated, arguing that this outcome is unlikely:

- Atomistic market
- Scales economies are “unimportant”
- Diseconomies of the large-scale firm are “important”
- Products are homogeneous

If at least one of these conditions is not met, “firms may grow or combine without loss of efficiency until their sizes are large and their number is few. Thereupon, the force of inter-firm competition may be restricted to permit periodic elevation of price above minimal average cost” (Bain, 1968, p. 181). Concentration can also be the result of the existence of barriers to entry of any of the three types identified by Bain: product differentiation (Chamberlin, 1937), absolute cost advantages and economies of scale. Regardless of the origin of concentration, the result will be a positive correlation between concentration and extraordinary profits. In Bain's words (1968, p. 439), “higher seller concentration within industries should be associated with substantial excesses of selling price over long-run average (and marginal) costs, moderately high or moderate seller concentration with appreciable but lesser excesses of price over cost, and lower seller concentration with no excesses at all- all this subject to two provisos” : (...) “price-elasticity of demand for industry output should be about the same for industries with different degrees of seller concentration (...)” and “barriers to entry to industries should not turn out to be lower for highly concentrated than for less concentrated industries”.

Product differentiation and the presence of barriers to entry, even when they do not create concentration in a market, also lead firms to set prices above the competitive level by giving them market power (Bain, 1968; Labini, 1969; Sraffa, 1926). For example, Chamberlin insists on the inevitable omnipresence of

⁵¹ Chamberlin, for instance, insisted on the fact that it is the downward slope of the individual firm demand curve (which is possible because of the existence of product differentiation acting as a barrier to entry that allows for a low price elasticity of demand) what “marks the contrast between monopolistic and pure competition” (Chamberlin, 1937). Harrod (1934) shared this view, although his definition of imperfect competition includes free entry.

product differentiation to justify market power: “no one else can produce a product identical with it, although he may be able to produce other which are fairly good substitutes for it. Under monopolistic competition, then, there can be freedom of entry only in the sense of a freedom to produce substitutes; and in this sense freedom of entry is universal, since substitutes are entirely a matter of degree” (Chamberlin, 1951, p. 567). In all cases, the underlying logic is that firms do not have to face as many rivals (or at least one challenging rival) as it would take for them not to be able to set uncompetitive prices. This may be the case either because their product is somehow ‘unique’ and captures a specific demand, either because there are barriers of any kind that limit the entrance of potential competitors or because the firm already possesses a certain scale that makes it dominant in the market. **The relevance of the concept of monopolistic competition should not be underplayed, as it shows that market power can prevail in almost any type of industry and firm.** Its strength relies on the fact that it shows that, independently of the position held in the market by firms and their sizes, they can all obtain and exert market power through product differentiation; and they all have incentives to do so: small firms with high production costs can avoid being swept out of the market by large firms with lower production costs, while the latter can avoid ruinous price wars by recurring to product differentiation.

Following the same trend, the kaleckian branch of post-Keynesian economics⁵² used the imperfect competition approach to build a correspondent pricing theory, mark-up pricing. This theory argues that firms set their prices on a cost-plus basis by adding a mark-up to prime costs (non-overhead costs are not included) (Lavoie, 2014; Lee, 1999). The size of the mark-up depends on what Kalecki called the “degree of monopoly” of the firm. The latter represents the firm’s market power, which level depends on the importance of market imperfections, which includes industrial concentration (Lee, 1999), barriers to entry (Hieser, 1953) and product differentiation. Then, mark-up pricing can be considered to be the pricing theory that matches the imperfect competition approach in the sense that it considers price level to be a result of the market power a firm holds, the latter being determined by a market structure that results from ‘realistic’ competitive conditions.

As a consequence of these market imperfections that allow for the setting of uncompetitive prices, profit differentials within and between industries appear (Chamberlin, 1937; Labini, 1969). Accordingly, most of the empirical contributions of authors from the SCP paradigm tried to explain a branch’s profit rate or profit margin using market structure variables, especially concentration and barriers to entry (Encaoua, 2015).

⁵² As we showed in subsection 1.3, there are two other post-Keynesian pricing theories (administered prices and normal cost pricing) that are more compatible with Marxian competition theory.

We would like to mention that these phenomena, contrary to what happens in Monopoly Capital Theory, also have a vertical dimension that we will not explore in depth in this chapter. The Harvard School, which served as the theoretical support of much of the antitrust legislation in the United States until the 1960s (Souty, 1995), produced a prolific literature on vertical restraints. The latter can be defined as the use of any kind of restraint (vertical integration, refusal to deal, setting high input prices, producing an input incompatible with the competitors', etc.) by an input supplier to obtain market power in the output market. This could result in vertical foreclosure (the exclusion of a competitor in the output market by using the market power obtained in the input market) or, in the case of vertical integration as a downstream and upstream monopolist, double marginalization (the obtaining of a double monopoly profit). The Harvard School was in general terms not supportive of vertical restraints, since it believed it would most certainly result in the exertion of market power (Encaoua, 2015) and, as a consequence, in an unequal distribution of profits between suppliers and buyers. It is important to mention the existence of the Harvard School's literature on vertical restraints and its main conclusion in the context of this chapter because it shows that the Harvard School considered competition for a market to take place also through the neighboring upstream and downstream markets. Then, we can conclude that the competition landscape in the Harvard School is composed of the market on which firms directly compete by selling the same or substitute products and the immediate upstream and downstream markets.

It is important to stress that in Imperfect Competition Theory competition is not annulled. It is not "perfect" in the neoclassical sense of the term, but this does not mean it does not exist. Firms do compete, but rather on quantities and quality (especially in imperfect markets characterized by high product differentiation) than on prices (Steindl, 1952). Moreover, firms' pricing power is not absolute (Kalecki, 1971). It is restricted by the extent of the market imperfections they benefit from, as the expression "degree of monopoly" shows. The higher entry barriers are, the higher the "limit price" (the price that would render the entrance of a potential competitor profitable) is (Labini, 1969).

We would like to end this subsection by stressing that the market power paradox holds in the imperfect competition approach according to which "competition can be permanent only when it is hampered by highly imperfect markets or softened by a spirit of live and let live among the entrepreneurs concerned" (Robinson, 1953, p. 592). **The imperfect competition approach argues that market power is the result of firms competing in a market structure that is far from the neoclassical characterizations of perfect competition, since characteristics such as scale economies, different technological capabilities between firms, consumers' psychology, the patent system or the size of the market prevail. Consequently, the outcome of competition in market structures with such characteristics can only be the exertion of market power that allows firms to set uncompetitive prices. Market**

power, then, is the outcome of real world “imperfect” competition. Therefore, the Harvard School has historically advocated for a harsh competition policy that would intervene on market structures in order to contain the exertion of market power, which is considered to be damaging in terms of economic efficiency and consumers’ welfare.

3.3 Some concluding comments regarding Monopoly Capital and Imperfect Competition theories

Having presented the particularities of Monopoly Capital and Imperfect Competition theories and their competition mechanisms, we would like now to classify them by following our reading grid. We will show how these two competition theories, in spite of coming from very different schools of thought, share some important features that allow us to group them.

A static concept of competition

The first point we would like to underline is the static character of the concept of competition in these theories. In both cases, the key aspect that defines competition is market structure (McNulty, 1967, 1968). Competition is generally defined in terms of the characteristics of a market: the size and nature of barriers to entry, the level of concentration and product differentiation. Accordingly, these authors oppose the era of “imperfect competition” or “monopolistic capital” to a “competitive” historical period that differs in terms of market structures. Then, the benchmark of competition is in most cases not competitive *activity*, but a *state* of the market, a market structure. This, of course, does not mean that competitive activities are excluded from these theories. As we mentioned above, the literature that draws from them, especially the imperfect competition literature, treats in detail competitive activities, mostly on quantities and quality. Moreover, Chamberlin’s concept of monopolistic competition focuses on firms’ activity of differentiating products. Nevertheless, in these theories, what shapes (imperfect or monopolistic) competitive activities and defines the degree of competition is in most cases a state of the market. Competitive *processes* are downplayed and replaced by competitive *states*. This is most striking in Monopoly Capital Theory which, having evolved from Marx’s version of Classical Theory, argued against the validity of its inter-industry and intra-industry competition mechanisms and introduced instead mechanisms that are based purely on market structures. Therefore, competition operates exclusively outside of the firm, in the market.

Competition being identified with some characteristics of the market, activities such as innovation within a firm are not seen as competition operating *per se* until they contribute to shape the market.

Competition is intra-industrial... and sometimes semi-vertical

In both theories, the stress is put on the predominance of high barriers to entry (Imperfect Competition Theory) or the difficulty of capital mobility (Monopoly Capital Theory). This, of course, eliminates the possibility or the relevance of inter-industry competition as described in Marxian Theory. On the contrary, competition happens within an industry by competing on quantities and/or quality. Sale efforts, advertising, client's good will and so forth are the methods employed by firms to compete for a certain industry's market shares. Nevertheless, Imperfect Competition Theory differentiates from Monopoly Capital Theory since it includes a "semi-vertical" dimension of competition. Indeed, the literature on vertical restraints explores how a firm can use the market power it possesses in its own market in a neighbor downstream or upstream market in order to benefit from larger extraordinary profits. This shows that competition is not only intra-industrial as in Monopoly Capital Theory. Nevertheless, the vertical dimension is limited to the vertically neighboring markets and the latter are only relevant as weapons in the competitive struggle in the main market. In Imperfect Competition Theory, the whole value chain that links firms vertically is not the competitive landscape of the firm. Therefore, we can say that in Imperfect Competition Theory competition is intra-industry and semi-vertical, while it is only intra-industry in Monopoly Capital Theory.

Competition leads to long-run profit rate differentials that result from market power asymmetries

Monopoly Capital and Imperfect Competition theories necessarily lead to conclude that some firms have more market power than others and, therefore, can benefit from a higher rate of profit. In fact, profit rate differentials are the manifestation of the power to set uncompetitive prices based on the particularities of the structure of the market in which the firm is present.

In Monopoly Capital Theory, concentration and its consequent erection of barriers to entry enables *some* firms to raise prices and the result is a "strikingly uneven distribution of profits" (Paul, 1957, p. 179) between firms. Firms belonging to industries in which entry is difficult because of the large amount of fixed capital needed to produce are of course the winners: they are able to set high prices and, as a result, in these industries "the rates of profit on invested capital are unequal but predominantly high", contrary to what happens in the "competitive industry of the economy" where "the mechanisms of equalization of the rates of profit operates" and, therefore, "the rates of profit are low" (Baran & Sweezy, 1968, p. 207). The result is the existence of "a different profit rate for the monopolistic industry and the competitive industry

(where this rate will be consequently lower)⁵³ (Baran & Sweezy, 1968, p. 45). We find the same idea in Mandel, who speaks of two average profit rates: one for the monopolistic industry and one for the non-monopolistic industry (Mandel, 1969). It is important to stress that since labor value theory is a central aspect of Monopoly Capital Theory, over-the-average profit rates, or higher average monopolistic profit rates, can only be possible if value created in the less profitable firms is transferred to the more profitable ones (Baran & Sweezy, 1968; Mandel, 1999). Indeed, the mechanisms that allow for this in profit rate differentials are based on the capacity to exclude some firms from competition and set prices above production (competitive) prices. Then, following the logic of Classical labor value theory, this can only happen if other firms are selling their output at prices above production prices. The over-profit of some firms is therefore made possible by capturing some value that, under a competitive regime, should belong to other firms.

Some authors belonging to the Dependency Theory tradition (Andre Gunder Frank, 1966; Marini, 1977; Santos, 1970) arrived to the same conclusion drawing from Monopoly Capital Theory. Their goal was to show how peripheral countries are dependent upon and subjugated to metropolises. Part of the explanations of this dependence was based on the mechanisms we have just described, with a difference in the geographical and political scope: monopolistic firms belong to metropolises and competitive firms belong to peripheral countries. Value transfer happens in part via international trade, which, according to Gunder Frank, is “the main international relation with which capitalist development in its monopolistic phase consolidates in detriment of the development of an even deeper underdevelopment in Latin America” (André Gunder Frank, Pacios, & Izaguirre, 1970, p. 191)⁵⁴. Marini supports this view when he claims that mechanisms of value transfer are rooted in productivity differentials and the monopoly of production of certain industrial goods from which metropolises benefit (Marini, 1977). Another mean by which this value transfer operates is metropolises’ direct ownership of monopolistic capital located in peripheral countries, which profit is returned to metropolises by transferring utilities or by the means of multinationals’ transfer prices practices (André Gunder Frank et al., 1970; Mandel, 1999).

Imperfect Competition Theory, as we saw above, also argues that competition leads to market power, which in turn makes differentials in profitability between firms possible. The only difference with Monopoly Capital Theory lies in the mechanisms each considers. While Monopoly Capital Theory refers

⁵³ The translation is ours.

⁵⁴ Idem.

almost exclusively to concentration to justify market power creation⁵⁵, Imperfect Competition Theory also refers to product differentiation (Chamberlin, 1951; Harrod, 1934) and non-concentration-related barriers to entry (Labini, 1969; Robinson, 1953). The result is, as in Marxian intra-industry competition, a myriad of profit rates. “Some firms in the economic system earn no profits in excess of the minimum counted as cost, others earn more than this, and in various degrees” (Chamberlin, 1937, p. 568).

4 Transaction Cost Theory and the hold-up problem

As we did with other theories, our description of Transaction Cost Theory (TCT) will focus on the concept of competition and its relationship to market power following our reading grid. Moreover, we will only refer to the aspects that are unique to this theory in terms of competition theory in order to avoid recalling common features with other theories (mostly with Modern Property Rights Theory, the Chicago School and the Harvard School’s).

TCT has a theory of the firm based on the ground ideas that Coase (1937) set in his famous article « The nature of the firm ». In this article, Coase asks why some activities are carried on within the firm instead of outside of it, i.e. through the market. His answer is that in a world where information is imperfect, market transactions are not costless (Barzel, 1997). Then, the costlier using the market is, the more likely it will be for an activity to be done inside of the firm. Nevertheless, coordination inside of the firm is also costly, since it implies some bureaucracy coordination costs, among other kinds of costs. Then, from Coase’s perspective, the boundaries of the firm will result from arbitration between the cost of coordinating activities through the market and the cost of coordinating activities inside of the firm.

Later on, Williamson took Coase’s question and answered in a similar but complementary way. He started by characterizing economic agents as agents with bounded rationality. Following Herbert (1957), he postulates that agents have limited cognitive skills. Contrary to economic agents in standard neoclassical theory, they cannot calculate every possible outcome and the consequences of their choices (Coriat & Weinstein, 2010). This means that contracts will never be complete in the sense that not every circumstance can be conceived and included in the contract. Unexpected events cannot be taken into

⁵⁵ Yet, some other factors somehow external to the mechanisms of competition are also quoted by authors of the Monopoly Capital tradition to account for capital immobility. Some authors quote “technological monopoly” or “technological rents” – the latter not being explained by any competition mechanism but rather assumed as a fact- (André Gunder Frank, Pacios, & Izaguirre, 1970; Mandel, 1999; Marini, 1977b) while others find political and military sources of monopolies in a world scale (Baran & Sweezy, 1968; Mandel, 1999) .

account in contracts. This will create two problems that will shape the boundaries of the firm and on which the TCT-specific market power mechanisms rely. First, given that information is not only imperfect but also asymmetrical, agents take advantage of contract incompleteness by recurring to opportunistic behavior, i.e. manipulation of information. Second, some activities require an agent investing in specific assets, assets that can render a higher value if used in a specific transaction (a transaction that usually depends on a particular agent) and, in the worst case, render little or no value in other transactions. In those cases, the incompleteness of contracts gives birth to the risk of hold-up: when a circumstance that is not contemplated in a contract that involves a previous investment on a specific asset by agent A occurs, agent B can benefit from the situation. It can threaten not to fulfill the transaction if it is not carried in a way that is more beneficial to it since the specificity of agent A's investment makes agent A *dependent* on B. Intra-firm coordination is the solution to the problems of opportunism and hold-up. Inside of the firm agents would not gain from being opportunistic or by holding-up other agents.

While Coase and Williamson differ in terms of their explanation of the boundaries of the firm, they both share the idea that “authority is the main ontological difference between market and firm” (Chassagnon, 2009). The firm is conceived as an organizational mechanism in which authority (i.e. the capacity of a boss to tell its employees what tasks they should accomplish and in what order) coordinates actions. In TCT, this authority derives simply from the nature of labor contracts and has the advantage of avoiding renegotiation when unexpected events occur by making discretionary decisions (Coriat & Weinstein, 2010).

TCT's further development relied heavily on game theory based modelling (Norman & Chisholm, 2014; Shepherd, 1982). The use of this mathematical tool is consistent with two aspects of TCT's approach to competition that are of special interest for our investigation. First, it shows that firms' strategic behavior is at the center of the analysis: firms act taking into account other firm's reactions to their actions and so on. This is at the core of classical subjects in the TCT-inspired industrial organization literature such as the credibility of a limit price strategy, competition on prices (Maskin & Tirole, 1988b) or quantities (Maskin & Tirole, 1988a) in a repeated infinite game, strategic irreversible investment to prevent competition and the possibility of an excess of investment for that reason (Fudenberg & Tirole, 1984). **Therefore, contrary to what happens in Imperfect Competition Theory, in TCT theory competition is conceived as a dynamic behavioral process.** Therefore, competition operates within the firm when it *behaves* strategically in order to be able to make a move in the future. It also operates, of course, in the market, when the moves take place.

Second, the use of game theory shows that, as in the Harvard School and the Chicago School, there are no competition mechanisms that hold for every case. Every game is different regarding market structure, which in TCT also includes the characteristics of information (its degree of symmetry and its completeness), as well as regarding firm's behavioral functions. Consequently, the answer to the market power paradox, although enriched by the contract-incompleteness-related source of market power, remains the same as the imperfect competition theories': **without adequate regulation, market power is the outcome of real world 'imperfect' competition.**

In our view, TCT's approach to competition and market power also distinguishes itself from other competition theories because of its incomplete contracts theoretical roots. Indeed, TCT acknowledges the same market imperfections that Imperfect Competition Theory does: markets are imperfect in terms of concentration, product differentiation and conditions of entry. But it adds a different source of market imperfections that become visible with the problem of opportunism. **In TCT, there is a novel behavioral dimension of market power: relationship lock-in. Since markets are 'imperfect' in many ways (including the distribution of and extension of information), there is interdependence between firms. This gives some of them market power that comes from behaving in an opportunistic manner. That market power ultimately comes from market imperfections, but it is translated differently according to the way in which firms act to use interdependence in their favor. Indeed, there are many optimal ways in which agents can rationally act to use interdependence to their advantage. In Mueller's (2012, p. 237) words, "the results of game theory are most often indeterminate"⁵⁶ (Osborne & Rubinstein, 1994) and, therefore, market power and the extent and distribution of its correspondent profit rate differentials also depend on the behavior chosen by firms, which can differ independently of the situation faced even when perfect rationality is assumed. Then, the firm's choice of actions has an influence on the resulting market power, which leads us to consider strategic action as a distinct source of market power in the TCT literature.**

It is important to stress that relationship lock-in is based on mutual interest by two firms. This distinguishes it qualitatively as a source of market power from barriers to entry. The latter implies that firms are impeded to compete or restrained in their competition. On the contrary, in relationship lock-in firms choose as a competitive strategy to relate to each other although this relationship might not be optimal for them because it is the best outcome they can get in a certain time frame. **Interdependence, which is the result of strategic choices in the context of a competitive struggle (and not a constraint to competition like barriers to entry), is the core of relationship lock-in.**

⁵⁶ The Folk Theorem is an excellent example of the indetermination of results in game theory.

In order to cover the integrity of our reading grid, we would like to point out that the TCT literature has held this view on market power and profit rate differentials and used the above-described approach to competition to analyze both horizontal and vertical competition. For example, the hold-up problem can be used to describe a supplier-buyer relationship between two firms in which one has bargaining power over the other. Tirole's and Rey's (1986) seminal article on vertical restraints between a manufacturer and a retailer is a good example of how TCT can represent vertical market power both in the organizational and behavioral perspectives that we have described in the previous paragraph. The article assumes information asymmetry between the producer and the distributor and shows that according to what the asymmetry of information is about (the demand function or retail cost) –organizational source of market power based on information problems and inter-dependence- and to how agents react to risk and the kind of vertical restraint chosen (if chosen) –behavioral source of market power based on agents' strategic choices-, the degree of market power will vary. Consequently, the profits in each case will differ. Nevertheless, TCT's stand on the exertion of vertical market power in vertical restraints, contrary to the traditional stands of the Chicago School and the Harvard School, is not monolithic. As Tirole (1988, p. 186) has put it, “theoretically, the only defensible position on vertical restraints seems to be the rule of reason. Most vertical restraints can increase or decrease welfare, depending on the environment. Legality or illegality per se thus seems unwarranted”. While the quote refers to welfare, the same goes for the exertion of vertical market power and its consequent profit rate differentials.

Finally, we would like to stress that, as with the other competition theories so far described that treat market power in its vertical dimension, TCT's analysis is made at the immediate upstream/downstream level. **The whole chain of production is never considered to be a single vertical field of competition.**

5 Evolutionary economics competition theories: the Austrian and the Neo-Schumpeterian traditions

Evolutionary economics brings together authors with different theoretical backgrounds that share a way of conceptualizing economic processes (competition being one of the main ones), although in many cases they differ in their understandings of the outcomes of these processes. Broadly speaking, for the purpose of this section, we can divide evolutionists into two groups: Austrians (Hayek, Von Mises, Mueller, High, Demsetz, Armentano) on one side, and what, following Hanusch and Pyka (2007), we will call the neo-Schumpeterian school (Dosi, Nelson, Winter, Freeman, Teece). The latter group is usually referred to simply as “evolutionist”. Nevertheless, we preserve the term “evolutionist” to refer to the theoretical

pillars these two schools share. The convenience of these broad distinctions will be clear in the next subsection.

Evolutionary competition theory is built on a theory of the firm that challenges all the basic assumptions of Neoclassical Theory and that approaches Classical Theory in many aspects regarding firm theory and competition theory. In terms of our study, it can be thought as a comeback to classical competition theory in the sense that it rejects the static view of competition that the Marginalist revolution set in the research program of both orthodox schools of thought (Perfect Competition Theory, Contestable Markets Theory) and heterodox ones (Monopoly Capital, Marxist theory, Dependence Theory, Mark-up Pricing Theory). The first evolutionary reaction to static competition happened at the beginning of the XXth century with Schumpeter and the authors of the Austrian School. These authors, although closely related to neoclassical theory in many aspects, differ majorly from it regarding competition theory. The second evolutionary reaction to static competition came from the neo-Schumpeterian tradition that strongly developed in the 1980s after Nelson's and Winter's *An Evolutionary Theory of Economic Change* (2004). The latter tradition, although distanced and critical of neoclassical economics in many aspects that go beyond competition theory, shares a common competition theory with the Austrian authors and Schumpeter.

Although evolutionary economics can be thought as a comeback to the dynamic concept of competition of the Marxian tradition, its research programs not being aligned with the compliance of the labor value law as this branch of Classical Theory is, we will show that the question of market power asymmetries and their effects on long-run profit rate differentials will not be answered in the same way as Marxian competition theory and its further developments do. We shall start by describing the main departures from neoclassical theory present in evolutionary economics to understand its competition theory.

5.1 A common ground between Austrians and Neo-Schumpeterians: an evolutionary the theory of the firm

The first main departure from neoclassical theory concerns the nature of the firm. Deepening into the resource-based approach of the firm (Coriat & Weinstein, 2010), the firm is conceived as an organization that, as such, is characterized by its (unique) repertoire of routines (Nelson & Winter, 2004). Routines are problem-solving devices (Coriat & Dosi, 2009) the firm possess and allows it to coordinate and treat knowledge. Since the firm is made of multiple individuals with different cognitive characteristics, routines create the coherence firms need in order to act as a single entity by constraining the individuals' behaviors (Winter, 1988). Routines are what make each firm unique since they are "idiosyncratic,

difficult to imitate, often only incrementally changing over time” (Dosi, 2012). They are organizational automatized responses to problems of wide-ranged problems on which the firm’s capabilities are built. In the words of Nelson and Winter (2004, p. 73), “individual skills are the analogue of organizational routines”. Since firms are intrinsically heterogeneous organizations, they carry “different technological, organizational and behavioural traits” (Dosi, Gambardella, Grazzi, & Orsenigo, 2007). Indeed, not only are firms different in respect to their routines (skills), but also regarding the decision rules (Chiaromonte & Dosi, 1993) on which their learning (and, therefore, the evolution of their routines/skills) depends. The routines and the organizational or technological knowhow that characterize a firm are largely tacit, which makes them difficult to transfer (Coriat & Weinstein, 2015, p. 130). This assures the heterogeneity will remain through time.

This leads us to the second ‘crucial departure’ from neoclassical firm theory, which “is to consider that the firm has a limited information and a bounded rationality, but is able to learn through time” (Lesourne, Orléan, & Walliser, 2006, p. 72). This means that, unlike the neoclassical firm, evolutionist firms “have at best imperfect understanding of the environment they live in, and, even more so, of what the future will deliver”. As defined in Dosi, Marengo and Fagiolo (2001) this implies limitations in: (i) access to information; (ii) memory; (iii) computational abilities; (iv) intrinsically imperfect representations of the environment in which firms operate; (v) ubiquitous limitations in the firm’s abilities to master physical and “social” technologies (vi) fuzziness, possibly incoherence, and instability in the perception of its own preferences (Dosi, 2012). Although “imperfect” (one could question the realism and the theoretical relevance of the postulated “perfect” rationality of the neoclassical firm...), the firm learns as a result of “experience and experimentation” (Dopfer & Potts, 2014). Routines, usually said to play the role genes play in biological evolution⁵⁷, are different to the latter in one fundamental aspect: they can be consciously (yet slowly) modified by the firm as an answer to its interaction with the economic environment. In order to do this, firms use their “meta-routines”, which are the routines that deal with the modification and adaptation of lower level routines (Nelson & Winter, 2004). Nevertheless, routines cannot change in any way and, more importantly, their change depends on the history of the firm. Path dependence (the recognition that “history matters”) plays an important role in evolutionary economics. At the firm level (and regarding competition theory), path dependence implies that “a firm’s previous investments and its repertoire of routines (its ‘history’) constrains its future behavior” (Teece, Rumelt,

⁵⁷ Many of the most relevant scholars in evolutionary economics treat routines as “quasi-genetic traits of the firm” (Cohen et al., 1996; Foss, Heimeriks, Winter, & Zollo, 2012; McKelvey, 1982; Nelson & Winter, 2004).

Dosi, & Winter, 1994, p. 17). In particular, “opportunities for successful new developments⁵⁸ will be ‘close in’ to previous activities”. This is so because “if too many parameters are changed simultaneously, the ability of firms to conduct meaningful natural quasi experiments is attenuated” (Teece et al., 1994, p. 17). The logic is simple. Firms accumulate specific skills that will be suitable to go in one direction but not in another. For example, a firm that accumulates skills regarding how to make micro-processors might be able to evolve and learn how to start making smartphones, but will find it difficult to enter the garment industry.

We shall now enter the learning process *par excellence* of the firm: competition. Competition is conceived in the evolutionary tradition as a “discovery procedure” (Hayek, 1968). It is a “market process of discovery and adjustment” that “works to coordinate anticipated demand with supply in a world of imperfect information” or, from the firm’s point of view, “an entrepreneurial process of discovery and adjustment under conditions of uncertainty” (Armentano, 1999). Firms are constantly searching for new technological and organizational arrangements that will allow them to survive and grow in the market by developing “relative advantages” (Nelson & Winter, 2004). This implies, among other things, technological innovation, organizational innovation, product differentiation, advertising, partnerships and joint ventures, etc. Competition is therefore “a struggle to achieve competitive advantages that derive from superior efficiency” (Jacobides, Winter, & Kassberger, 2007, p. 4) in an uncertain environment that no firm can perfectly predict or know. Firms react to market responses and try to adapt to them in their quest for survival and growth.

While both Austrians and Neo-Schumpeterian agree on this firm-level vision of what constitutes competition, they differ in how they conceive the competitive interaction between firms and, in some cases, in the outcomes of these interactions in terms of market power and long-run profit rate differentials. As we will show in the following pages, Austrian authors consider that, for different reasons, competition always leads to the disappearance of market power. In the case of Neo-Schumpeterians, this is not a shared vision, as conceptions on how the “selection environment” (a concept proper to this school of thought we will develop) works differ.

⁵⁸ The term “new developments” should be understood in the broadest possible sense here (a change in routines, technological innovation, organizational innovation, etc.).

5.2 Competition in the Austrian tradition

The Austrian school, like neoclassical economics, treats the issue of long-run profit rate differentials mainly in terms of market power, the latter being understood as a firm's capacity to control market prices or, put in other terms, to set a monopoly price "higher than the potential market price would have been in the absence of monopoly" (Von Mises, 2008)⁵⁹. In Hayek's words, "competition prevails, that is, if the individual producer has to adapt himself to price changes and cannot control them" (Hayek, 2014, p. 52). As the previous quote shows, the Austrian school considers the capacity to control prices (which allows for the existence of long-run profit rate differentials) to be something external to competition. Authors like Mueller and Reardon (1993) have addressed the issue directly in terms of profit rate differentials. The logic remains the same, since the potential above normal rates of profit would come from prices set above their competitive levels. In any case, the Austrian school's answer to the above-formulated question is an emphatic "no": competition does not lead to long-run profit rate differentials. The selection environment works. But why?

The Austrian school conceives the selection environment as we pictured it above. "In the real business world, a dominant firm, as distinct from a textbook monopolist, arises and operates under uncertain, disequilibrium conditions. The dominant firm gains and holds its market share by engaging successfully in a competitive market process of discovery adjustment. And as a consequence of its market-coordinating skills, the dominant firm tends to grow faster than its rivals (or potential rivals) into a position (perhaps temporary) of market dominance" (Armentano, 1989, p. 65). Their particular contribution to evolutionary competition theory comes from the arguments they provide to claim that competition prevails even in conditions of concentrated market structures. Austrian authors, just as neoclassical authors of the perfect competition framework, believe that competition leads to the absence of market power (and, hence, market power-based long-run profit rate differentials), but for very different reasons. While the perfect competition framework states that, when competition prevails, it will tend to reproduce an atomistic market landscape of small firms, Austrian competition theory, similarly to the contestable market framework, states that "*any* market structure is compatible with an efficient market process as long as there are no legal barriers to entry" (Armentano, 1989, p. 71, emphasis in the original). "*We have no theory that allows us to deduce from the observable degree of concentration in a particular*

⁵⁹ It is important to stress that the potential market price in the absence of monopoly is not equal to the perfect competition price of the neoclassical school, which existence and theoretical relevance Austrian authors argue against, as we will explain later.

market whether or not price and output are competitive” (Demsetz, 1968, pp. 59–60, emphasis in the original).

Indeed, in the Austrian tradition, market dominance is nothing but the result of a successful competitive performance (Souty, 1995). “Dominant firms have achieved their position of ‘dominance’ in free markets by being successful. They have innovated the products and services that consumers prefer relative to rivals and potential rivals” (Armentano, 1989, p. 68). Even in the extreme case of monopoly, market dominance will not induce the firm to set uncompetitive prices and, so, to obtain high profits (Souty, 1995). Indeed, if, because of economies of scale, one producer obtains a monopoly, this does not imply that it will practice a monopoly price. The smallest price will prevail. “Price will tend toward ‘cost’ (everything else equal) and profit incentives will drive cost curves to a minimum level” (Armentano, 1989, p. 65). Since only equally efficient enough companies are supposed to survive the selection environment, this implies that “all individual company profit rates converge to a single, competitive level”. (Mueller, 1986, p. 13). “Supranormal profits are the reflection of superior management” (Atkinson & Audretsch, 2011, p. 29) but, like in the labor value branch of Classical Competition Theory, they will not persist in the long-run unless the dominant firm can continue to improve its efficiency in every period, and they are not the result of the exertion of market power. The argument that supports this claim is simple: a dominant firm will be constantly trying to reduce its prices in order to maintain its privileged position. Yet, for this argument to be plausible, the firm should know that there is no other way of maintaining its privileged position. This is the case in the Austrian tradition for two reasons.

The first one is an argument shared by the Marxian tradition we referred to previously: barriers to entry are temporary. While Austrian authors consider all non-legal barriers to entry as legitimate competitive weapons (Souty, 1995), they argue that “after all, free markets are always open to potential rivalry and entry, and dominant suppliers can attempt to maintain their market positions only by maintaining an overall efficiency advantage over potential users of resources” (Armentano, 1989, p. 71). In terms of the rate of profit, this means that “the forces of entry are strongly and rapidly attracted to excess profits” (Mueller, 1986, p. 4). Then, like in the classical tradition, extraordinary profits between industries are only temporary. In Demsetz words: “Even though the profits that arise from a firm's activities may be eroded by competitive imitation, since information is costly to obtain and techniques are difficult to duplicate, the firm may enjoy growth and a superior rate of return *for some time*” (Demsetz, 1973, p. 3, emphasis added). As we did with Marxian authors, we will not enter into details regarding the arguments supporting the temporariness of barriers to entry, the object of the current chapter being to position competition theories in our cartography and to identify the main unresolved problems regarding market power in competition theories.

The second argument is that even if a monopolist could exclude potential entrants, it will still have to compete with other goods producers for consumers' purchasing power, which will lead the monopolist to set the lowest possible price and to try to constantly improve its efficiency. "The shape of the demand curve that makes the appearance of monopoly prices possible and directs the monopolists' conduct is determined by the competition of all other commodities competing for the buyers' dollars. The higher the monopolist fixes the price at which he is ready to sell, the more potential buyers turn their dollars toward other vendible goods. On the market every commodity competes with all other commodities" (Von Mises, 2008, p. 278).

5.3 The concept of selection environment in the Neo-Schumpeterian tradition

While the previous paragraph describes the competitive activity, a second and closely related element is needed to complete the analysis of competition in the evolutionist tradition: the competitive forces referred to as the "selection environment". As we mentioned, firms respond to the selection environment (markets) by adapting their behaviors. But what is exactly a selection environment? How does it work? The answer to these two questions, we will see, are of paramount importance and continue to constitute the evolutionist research program.

The concept of selection environment is rather opaque (Hodgson, Samuels, & Tool, 1994) and has been referred to as a truism (Knudsen, 2002). There are many reasons for this. On the one side, there are many definitions that include heterogeneous dimensions on which the selection depends⁶⁰. On the other side, the mechanisms through which selection operates also vary considerably among authors. Despite these dissimilarities, the main concept can be summarized as it follows. The selection environment plays the role the fitness function plays in biology. In a nutshell, it determinates what firms/strategies "fit" the competitive environment and, therefore, what firms will eventually survive the competitive struggle. Firms that can easily adapt and find the best-suited technologies and organizational arrangements will be "selected". On the contrary, firms that cannot easily adapt and tried inefficient technologies and organizational arrangements will be "punished" by the economic environment with a bad performance that will put them one step closer to exiting the market. Selection environments "include many aspects of

⁶⁰ For a mapping of the different dimensions and theoretical perspective of the organizational fitness on which the selection environment relies see (Hodgson, Samuels, & Tool, 1994).

markets: public policy impact (especially regulation), frequency of technologic discontinuities, market structures, openness of markets (which depends on the nature and the importance of barriers to entry), possibility of access to financial resources....” (Coriat & Weinstein, 2015, p. 129)⁶¹. Since these aspects vary from market to market, it follows that some selection environments are “tighter” than others.

Two movements take place during selection: “at the firm level, selection is accomplished primarily through market processes involving entry and exit; growth and decline provide a second mechanism” (Teece et al., 1994, p. 22). Indeed, a main sequence can be identified: (1) incumbent and entrant firms try different strategies to improve their efficiencies (2) the selection environment “judges” the success of the strategy chosen (3) the firm grows if the strategy is successful or loses market share and/or profitability to successful firms if the strategy is not successful. (4) Firms learn from the selection environment’s response to their initial strategies and adapt the latter to perform better in the future (the “discovery procedure”). Eventually, repeatedly unsuccessful firms exit the market.

As we mentioned above, the mechanisms that determine the factors on which entry and exit, on the one side, and growth and decline, on the other side, differ between and within authors depending on the model employed. Nevertheless, these mechanisms are of little importance in order to explain how a selection mechanism (regardless of the concrete form it takes) operates. We will take as an illustration the canonic selection mechanism developed by Nelson and Winter in Chapter 12 of *An Evolutionary Theory of Economic Change* (2004). In this model, firms compete by engaging in R&D investment to make innovations that can improve their productivities or not. Firms can also choose to imitate another firm’s successful innovation. If they choose to innovate, they cannot know in advance which innovation will succeed and which will not: “there is no choice that is clearly best ex ante” (Nelson & Winter, 2004). Increased productivity allows them to lower prices and to win market shares and therefore to expand. As a result, there will be winners and losers. “Some firms track emerging technological opportunities with greater success than other firms; the former tend to prosper and grow, the latter to suffer losses and decline. Growth confers advantages that make further success more likely, while decline breeds technological obsolescence and further decline” (Nelson & Winter, 2004, p. 325). Since, as we explained, firms are different in their routines/skills and their learning processes, their responses to market signals will differ, and so will their evolutions. “One function of competition, in the structural sense of many firms, then would be to make possible that diversity. Another function of competition, in this more active sense, is to reward and enhance the choices that prove good in practice and to suppress the bad ones. Over the long-run, one hopes, the competitive system would promote firms that choose well on the

⁶¹ The translation is ours.

average and would eliminate, or force reform upon, firms that consistently make mistakes” (Nelson & Winter, 2004, p. 276).

However, Dosi (2012), along with Dosi and Nelson (2010), acknowledges that empirical studies show the contrary: “contemporary markets do not appear to be too effective selectors delivering rewards and punishments in terms of relative sizes or shares, no matter how measured, according to differential efficiencies” and therefore “diverse degrees of efficiencies seem to yield primarily relatively persistent profitability differentials” (Dosi & Nelson, 2010, p. 103). This “requires that evolutionary theories re-think their account of the selection landscapes- that is the space over which competitive interactions are represented” (Dosi, 2011).

5.4 The long-run profit rate differentials cleavage in Evolutionary economics

Dosi calls for a revision of evolutionary competition theory because the latter would not fit empirical evidence. Nevertheless, not all evolutionary competition theory goes against this empirical evidence. There is in fact a cleavage regarding this crucial aspect of competition theory that, to our understanding, has been underestimated by most of the evolutionary literature⁶². One could rephrase the problem as it follows: do selection mechanisms assure that only the most (equally?) efficient firms will survive in the long-run? If not, why not? This brings us back to the problem of long-run profit rate differentials between firms. In other words, we are asking if the selection mechanism (the evolutionist forces of competition) will lead *per se* to long-run profit rate differentials between firms. If so, are the latter caused by market power asymmetries?

Two branches can be identified in terms of the evolutionist tradition’s answer to the problem of long-run profit rate differentials and the selection environment: the Austrian approach shared by some neo-Schumpeterians and the “deviant neo-Schumpeterian approach”. We have chosen the term “deviating neo-Schumpeterians” to refer to the neo-Schumpeterian authors who do not share the Austrian view according to which competition annuls market power and, therefore, does not lead to long-run profit rate differentials. Indeed, Dosi (2012) claims in some of his works that the mechanism should work in theory. The same claim is supported by Winter, Dosi and Kaniovski (2003, p. 379):

⁶² Dosi’s above-quoted call for a revision of evolutionary competition theory constitutes an exception, of course.

“The view of the outcomes of the competition process, in a sense, is a formal vindication of the intuition of classical economists that conditions of entry and (heterogeneous) techniques of production determine some sort of ‘centers of gravity’ around which actual prices, quantities and profitabilities persistently fluctuate”.

Teece *et al* (1994), as well as Alchian (1950) also share this view, although Teece *et al* consider that there are often exceptions to the theoretical effectiveness of the selection environment:

“Selection is the process by which inefficient firms or businesses get weeded out. At the firm level, selection is accomplished primarily through market processes involving entry and exit; growth and decline provide a second mechanism. Neither mechanism works instantaneously so that firms with different capabilities may exist side-by-side attempting to serve the same customer needs. Indeed, bankruptcy laws in certain countries may slow selection processes. However, ‘market rationality’ eventually prevails, and less competent firms, and less competent firms can be expected to decline and exit” (Teece et al., 1994, p. 22).

As we mentioned, not all neo-Schumpeterian evolutionists share the same view. Dosi and Chiaromonte (1993) have developed an evolutionary model in which competition in a selection environment produces “persistent asymmetries in efficiency and profitability among firms” attributed to “firm-specific decision rules, together with the history of innovation, imitation, and learning by individual agents” as well as to “the fact that no agent is capable of correctly computing *ex ante* equilibria where individual actions are reciprocally consistent” (Chiaromonte & Dosi, 1993, p. 52). Yet, although it explains the continuous appearance of differences in profitability, it is not clear why the selection environment does not eliminate the less profitable firms in the long-run.

Three arguments have been pointed out by deviating neo-Schumpeterian evolutionists to solve this problem. The first one is market concentration, as Jacobides, Winter and Kassberger make explicit by stating that “if only one or a few firms are particularly efficient, their increasingly dominant role should eventually enable them to affect prices. The hand of selection may create oligopoly or monopoly” (Jacobides et al., 2007, p. 7)⁶³. Nevertheless, for this argument to hold, the weakness or inexistence of barriers to entry should be admitted.

The second argument is what Dosi considers to be “the single most important factor in accounting for persistently heterogeneous performances”: “equally heterogeneous organizational capabilities –

⁶³ Curiously, the passage quoted was not included in the final version of the paper that was published in *Strategic Management Journal*, Vol. 33, Issue 12.

idiosyncratic, *difficult to imitate*, often only incrementally changing over time” (Dosi, 2011, 2012, emphasis added). In particular, the argument relies on the existence of four kinds of asymmetries between firms (Dosi & Nelson, 2010).

- (i) Differences in the ability to innovate and/or adopt innovation developed elsewhere regarding product characteristics and production processes
- (ii) Different production efficiencies
- (iii) Different organizational arrangements
- (iv) Different propensities to invest and grow conditional on the foregoing set of variables

We could add a fifth source of difficulty to imitate, “ambiguity as to what factors are responsible for superior (or inferior) performance” or “uncertain imitability” (Lippman & Rumelt, 1982). This uncertainty does not come from bounded rationality but from the inherent ambiguity there is regarding the outcomes of market discovery processes such as innovation⁶⁴. As a result, firms “obtain different ‘quasi-rent’ or, conversely, losses above/below the notional ‘pure competition’ profit rates” (Dosi & Nelson, 2010, p. 103).

The above-quoted paper by Jacobides, Winter and Kassberger develops a model that illustrates this argument. In that paper, the authors explore in detail another explanation in an evolutionary framework: “profitability that is *sustainable in long-run equilibrium, even under competitive conditions* may derive from the possession of idiosyncratic rent-earning resources” (Jacobides et al., 2007, p. 21, emphasis in the original). The authors lean on a resource-based view (RBV) inspired literature on the capacity of idiosyncratic resources to render abnormal profits in equilibrium (Barney, 1991; Peteraf & Barney, 2003) to develop an evolutionary model of constant disequilibrium that produces the same results. Their explanation of how idiosyncratic rent-earning resources can give firms long-run abnormal profits is the following. Every firm can invest in customizing resources in order to obtain an idiosyncratic resource that, in this particular model, is assimilated to a skilled worker. Since firms differ in their behaviors, not all of them will invest in resource customization. Customization is considered to be a once-and-for-all investment that, if successful, allows for a greater growth and profit. Therefore, as expected in an evolutionary competition theory, there will be winners and losers. The key question is why losers are not eliminated by the selection environment. The authors’ answer is that “firms of somewhat inferior skills

⁶⁴ In the authors’ words, “there is a difference, for example, between being unable to predict the exact size of an underground oil deposit, and being unable to work out the optimal drilling policy in the face of uncertainty” (Lippman & Rumelt, 1982, p. 421).

might well persist, even in long-run equilibrium (as long as they happened to appear early on, made the appropriate sunk investments, and were not too inefficient). This provides an evolutionary explanation for heterogeneity in capabilities even in long-run ‘selection equilibrium’” (Jacobides et al., 2007, p. 13). Moreover, “the extent of dispersion that can be sustained in equilibrium is a function of the extent to which it is difficult to convert ‘generic inputs’ into ‘idiosyncratic resources,’ as well as of the interest rate, and of the relative role of these ‘idiosyncratic’ resources in total output (Jacobides et al., 2007, p. 13).

The third deviating neo-Schumpeterian argument is more general than the previous one and complementary to the two arguments we have just exposed. The idea is simple: “the selection environment works by “selecting not the most fit or profitable or in some way entity, but selecting a range of tolerably well fit. Selection as a filtering mechanism favours not the fastest, but the sufficiently fast, not the most profitable, but the sufficiently profitable” (Dopfer & Potts, 2014, pp. 95–96). Although this seems plausible, the determinants of the extent of the range of the selection and, more fundamentally, the reason of the existence of a range of selection should be specified. Regarding the latter, possible explanations are “the ‘sunkness’ and indivisibilities of many technological events and investment decisions” (Dosi & Nelson, 2010, p. 103).

5.5 Some concluding comments regarding Evolutionary competition theories

We would like to conclude the section on Evolutionary competition theory by examining how it answers the questions that constitute this chapter’s reading grid.

Unquestionably, evolutionary economics conceives competition as a behavioral “active dynamic process” (Nelson & Winter, 2004, p. 275). The competition process we described above shows this. Firms compete by constantly innovating and adapting to the competitive environment in which they are embedded. Routines are modified in a never-stopping process of trying new strategies to survive and to grow in the market. As in the classical tradition, the outcome of a multiplicity of firms’ competitive *activities* is an aggregate force that is imposed to every firm in order to survive (McNulty, 1968). Consequently, evolutionists see “competition as a dynamic process that select among the effective actions of firms”. The “selection process” (Dosi et al., 2007) is in evolutionist literature the force that is imposed to firms as a result of decentralized rivalry between them. As a consequence of this, competition takes place both inside and outside the firm. At the firm level, competition operates when firms innovate, act and react to market signals. “The function of competition is to get -or help to get- the signals and incentives right”

(Nelson & Winter, 2004, p. 276), which is precisely the role of the selection environment. Then, competition operates also outside of firms by constraining their behaviors, punishing and rewarding, selecting them.

Regarding the field of competition, evolutionary competition theory can be said to focus on intra-industry competition. Contrary to its closest neighbor, the labor value branch of Classical competition theory, Evolutionary competition theory does not explicitly include competition mechanisms that link different industries. Their description of competitive activity either refers to intra-industry competition mechanisms where selection environments are industry-specific or uses these very same mechanisms to refer to inter-industry competition. Regarding this, we share Glick's and Ochoa's (1990, p. 25) view according to which in this literature "the different roles played by firms and industries in competition" (...) "often lacks clarity"⁶⁵.

The issue of long-run profit rate differentials has been addressed in the previous subsection. We will therefore recall the main findings regarding that topic. Evolutionary competition theory is branched in two in respect to the problem of long-run profit rate differentials. On the one side, the Austrian branch (which, as we pointed out before, also includes some neo-Schumpeterians) believes selection environments tend to weed out inefficient firms and that, in the long-run, only the most efficient ones will survive. Therefore, profit rate differentials are only temporal. Market power is not a possible outcome of competition; the market power paradox does not hold. In Alchian and Demsetz's (1972, p. 111) words, the firm "has no power of fiat, no authority, no disciplinary action any different in the slightest degree from ordinary market contracting between any two people". On the contrary, another branch, deviating neo-Schumpeterian economics, believes that selection environments do create long-run profit rate differentials mostly dependent on market power asymmetries. Three mechanisms have been identified in the evolutionist literature to account for this:

- i) Uncompetitive price setting by firms that benefited from their previous efficiency and grew enough to obtain a big share of the market (endogenous concentration)
- ii) Obtaining "quasi-rents" by possessing "idiosyncratic rent-earning resources" (Jacobides et al., 2007) that are "difficult to imitate" (Dosi, 2012).

⁶⁵ In the passage quoted, the authors refer to what they call "the empirical literature" and they quote Demsetz to exemplify, so we can without much risk of being mistaken associate this statement to evolutionary literature in general.

iii) The selection environment selects a wide range of firms of considerable different performance. The possible explanation for this found in the literature is “the ‘sunkness’ and indivisibilities of many technological events and investment decisions” (Dosi & Nelson, 2010, p. 103).

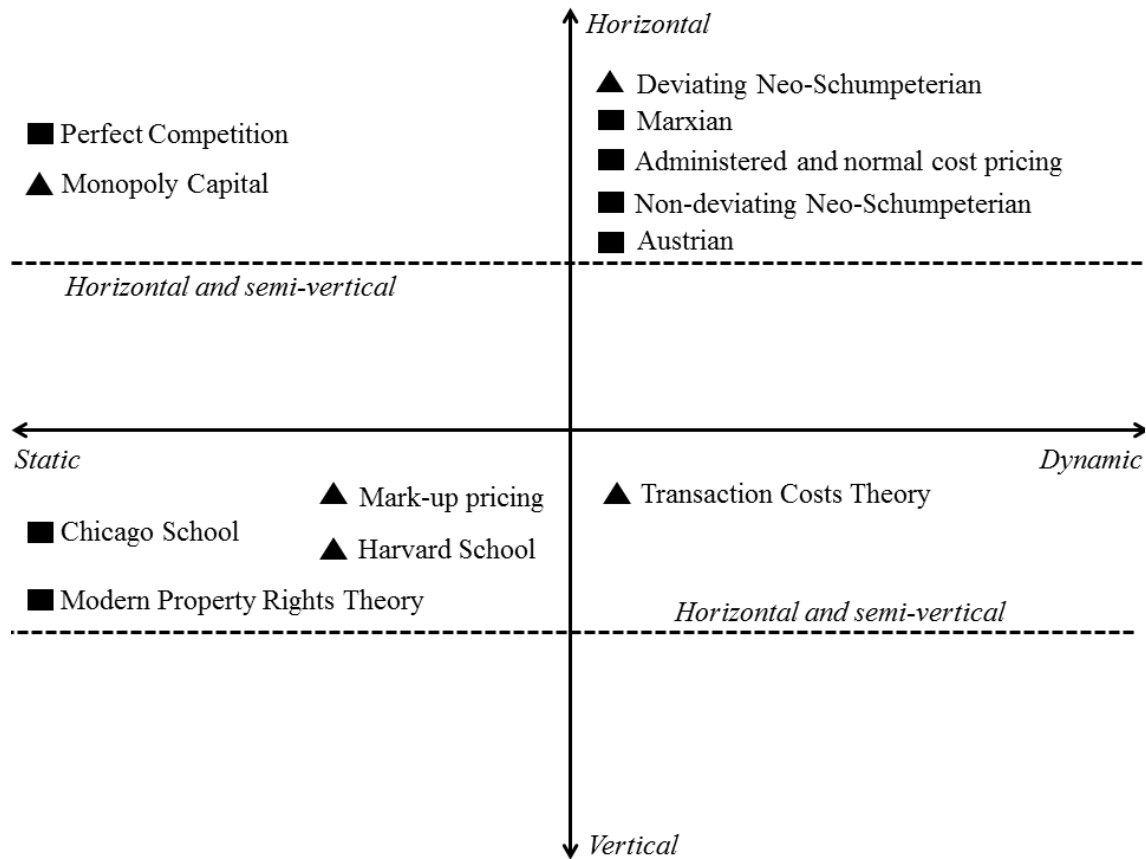
Further descriptions of the types of firms that can benefit from these market power asymmetries to obtain a higher profit rate in the long-run are scarce in the evolutionist literature. Nevertheless, some allusions to the subject can be found in the literature. Two explanations can be offered to account for it. Schumpeter offers two typologies of firms that benefit from market power asymmetries. One that corresponds to the ‘first’ Schumpeter -the one from *The Theory of Economic Development* (1961)- distinguishes between innovating firms, non-innovating firms that do not aim to conquer a large market share, non-innovating firms that try to modify their methods and non-innovating monopolies. The second Schumpeter’s typology differentiates between big innovating firms and the rest. Pavitt’s taxonomy is another possible typology of market power asymmetries in the evolutionist tradition. Although its aim is to “describe and explain industrial patterns of technical change” (Pavitt, 1984, p. 1) and that no mentions of the different groups being unequally performing is made, the typology contains an interesting element that, if developed, could become a typology of market power asymmetries. Pavitt’s typology includes the means of appropriation of innovation (non-technical, process secrecy and know how, dynamic learning, patent, etc.) as a variable to class industries. It could be thought that if these means of appropriation are unequally effective, market power asymmetries would exist between industries, leading to long-run profit rate differentials between industries. In that case, there would be four categories of industries in terms of the market power asymmetries they would lead to that have already been identified by Pavitt (1984): supplier-dominated, scale-intensive, specialized suppliers and science-based.

Since selection environments are industry-specific, market power asymmetries exist only within an industry. Yet, by developing the above-mentioned idea of differentials in the appropriability of innovations between industries, it could be argued that profit rate differentials may exist between industries. Another argument to support this view would be that some selection environment being “tighter” than others, profit rate differentials can also exist between industries, since the distribution of market power is not homogeneous across industries. Nevertheless, to our knowledge none of these possibilities has been researched by evolutionist authors.

Conclusions

In this chapter we have reviewed the existing competition theories with a focus on how they conceptualize the link between competition and market power. In order to do so, we have analyzed competition theories according to three criteria: their dynamic/static status, the scopes of competition they take into account (horizontal, semi-vertical and vertical) and whether competition leads to market power mechanisms that result in long-run profit rate differentials between firms or not (i.e. how they answer the market power paradox). The results of this classification are summarized in Figure 14.

Figure 14: A cartography of competition theories



LEGEND

- No market-power-based long-run profit rate differentials as a result of a competitive dynamic/state
- ▲ Market-power-based intra and inter-industry profit rate differentials as a result of a competitive dynamic/state

The x-axis refers to the nature of competition (dynamic or static) while the y-axis refers to the dimensions of the competition landscape (horizontal, vertical, semi-vertical and fully vertical) taken into account. Finally, the shape of the image that represents each theory (a dot, a square or a triangle) indicates how the market power paradox is answered. One should bear in mind that there are no exclusively vertical/horizontal or exclusively dynamic/static competition theories and, in that manner, Figure 14 represents a broad typology.

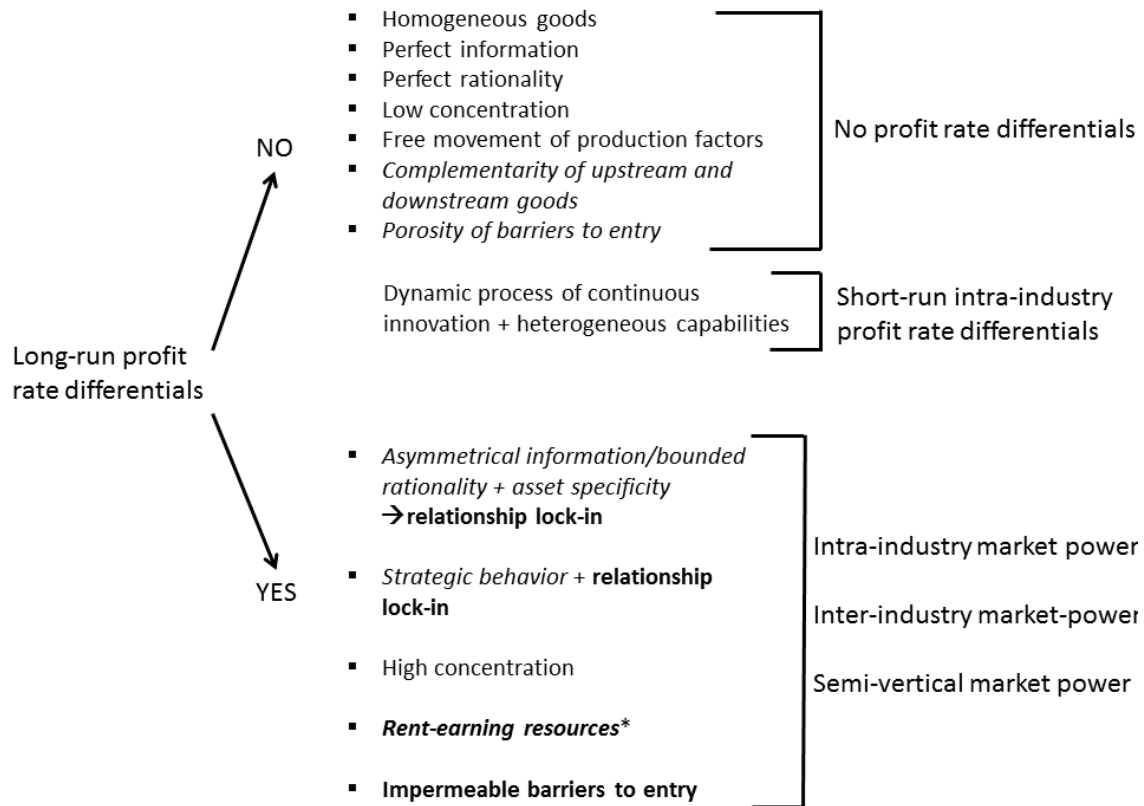
One of the main conclusions we can draw from this chapter is the lack of a fully vertical competition theory. In most competition theories, when inter-industry competition is considered, no qualitative difference is made between vertically-related, horizontally-related and diagonally-related industries. When some theories conceptualize vertical competition and its specific mechanisms are described, only immediately vertically-related firms are considered (i.e. the scope of competition is semi-vertical). As shown in Figure 14, in no case the vertical dimension of competition is taken into account as a single space of competition that relates industries that are not directly linked by market transactions. We consider this to be a symptom of a narrow and outdated conception of markets and market structures that does not depicts two of the main traits of the current dominant form of competition identified in Chapter I: vertical disintegration and modular production. In competition theory, market structures are usually analyzed in terms of concentration, product differentiation, barriers to entry and (since the emergence of TCT) the distribution of information and property rights with a horizontal and semi-vertical scope. This is particularly problematic since, as we have seen in the opening chapter, since the 1980s vertically disintegrated production and modular production are the norm (Cattaneo, Gereffi, & Staritz, 2010; Chassagnon, 2011; Langlois, 2003; Powell, 2003; Richardson, 1994; Sturgeon, 2002). This should lead research on competition theory toward taking into account the shape of production networks from the first to the last link of the production chain. Nonetheless, the explanation of vertical market power and vertical long-run profit rate differentials remains an open question that is under theorized.

By analyzing Figure 14, we arrive to the second main conclusion of this chapter: the dynamic/static distinction, although valuable, is not sufficient to understand how a competition theory answers the market power paradox. The distinction between dynamic and static theories is nowadays a common and the sole border drawn by authors interested in a critical analysis of competition theories (Benzoni, 1991; Guerrero, 1994; McNulty, 1967; Metcalfe, 1989; Moudud, 2012; Tsoulfidis, 2015). Although we consider this distinction to be crucial, it is not sufficient to account for how each theory answers the market power paradox. Figure 14 shows that there is no link between the dynamic/static status of competition theories and the way in which they answer the market power paradox. We can find on the right side of the graphic

dynamic competition theories, all of which answer the paradox in different ways. Austrian, Marxian (including its further developments with the administered and normal cost pricing theories), and Non-deviant Neo-Schumpeterian theories claim that competition does not lead to market power asymmetries and long-run profit rate differentials between firms, while deviating neo-Schumpeterian and Transaction Cost theories support the opposite view. Marxian competition theory offers a singular answer: competition leads to long-run profit rate differentials, but only between firms belonging to the same industry and not through the creation of market power. Contrary to the rest of the theories that support the idea that competition leads to long-run profit rate differentials between firms, Marxian competition theory argues that they are not based on market power that would have been created in the competitive process, but rather the outcome of a competitive process in which market power does not intervene. The left side of the graphic, which groups static competition theories, is as heterogeneous as the right side. While Perfect Competition, Modern Property Rights and Chicago School theories argue that competition leads neither to profit rate differentials between firms nor to market power, Monopoly Capital, Mark-Up Pricing and Harvard School theories claim the contrary. **Hence, the key to understanding the way in which competition theories answer the market power paradox does not lie in the dynamic or static status of these theories. We need to go beyond this distinction if we are to understand the existing theorization on one of the core issues of any competition theory: the relationship between competition, market power and long-run profit rate differentials.**

In order to understand why competition theories that are heterogeneous regarding their dynamic/static status and their theoretical background answer in the same way the market power paradox we have to pay attention the competitive mechanisms they describe. Figure 16 summarizes the mechanisms found along our analysis of the different theories (most of them reappear in many theories) that are put forward in order to explain the origin or the non-existence of long-run profit rate differentials between firms.

Figure 14: Sources of long-run profit rate differentials in competition theories



* Rent-earning resources can in many cases be both the origin of inter-firm dispersion of efficiencies and a mechanisms through which they persist

NB 1: sources in italics correspond to sources that constitute sufficient conditions for market power-based long term profit rate differentials

NB 2: mechanisms in bold letters correspond to mechanisms that impede the elimination of long term profit rate differentials

Regarding theories that claim that competition does not lead to long-run profit rate differentials, the porosity of barriers to entry is what assures that firms will not exert market power (it is the sufficient condition in the theories that can make the market power paradox not hold) and therefore no long-run profit rate differentials will arise, even when market structures are not ‘perfect’ in terms of concentration and product differentiation. This view is held both by static competition theories such as Perfect Competition or the Chicago School and dynamic competition theories like Marxian competition theory. Indeed, contemporary authors of the Marxian tradition and the Chicago School have shown, as we saw earlier, that market structures can be imperfect regarding concentration and product differentiation while there can still be a competitive scenario as long as barriers to entry are porous. In that case, even if some firms have market power, they cannot exert it. This is therefore an argument reliant on market structures that questions the possibility of the *exertion* of market power. There is empirical evidence to support this

claim that shows no correlation between concentration and high profitability at the industry level (Sawyer, 1981; Semmler, 1984) or even a negative correlation between concentration and profitability differentials between industries (Keil, 2013; Tsaliki & Tsoulfidis, 1998). It is important to stress that although the dynamic Austrian, Non-deviating neo-Schumpeterian and Marxian theories claim that competition does not lead to long-run profit rate differentials, they support the idea that short-run intra-industry profit rate differentials exist as a result of the continuousness of the process of innovation and the heterogeneity of firms' capabilities.

In the case of supporters of the idea that competition leads to the creation of long-run profit rate differentials between firms of different industries, the arguments held are slightly more abundant. First we have market concentration, which is an argument present in all of these theories, either presented as a state of affairs or as the result of competition in the sense that firms need to scale up production to survive the competitive struggle and hence markets become concentrated. The presence of barriers to entry is the second main argument that all of these theories share. A very similar argument is the holding of rent-earning resources of any kind (organizational skills, intellectual property assets, privileged access to a natural resource, etc.). In many cases, rent-earning resource can be considered to be a barrier to entry, so the two categories may overlap, although not necessarily. Fourth, we have the conjugation of incomplete contracts (which, in turn, may be the result of bounded rationality –TCT- or the non-observability of outcomes – NPRT-) and relationship lock-in (either by concentration or by the complementarity of assets). Fifth, there is a TCT-specific market power mechanism: the impact of agent's strategic behavior (their choice of actions) in imperfect markets. These five mechanisms can be applied to explain long-run profit rate differentials both within and between industries, including semi-vertical long-run profit rate differentials when firms use a neighbor upstream or downstream market to obtain market power in their market. In order to fully grasp the qualitative differences between these five sources of market power that explain profit rate differentials between firms of different industries, it is of vital importance to remember that relationship lock-in is based on mutual interest by two firms. This distinguishes it qualitatively as a source of market power from barriers to entry. The latter implies that firms are impeded to compete or restrained in their competition. On the contrary, in presence of relationship lock-in, firms choose as a competitive strategy to relate to each other although this relationship might not be optimal for them because it is the best outcome they can get in a certain time frame. **Interdependence, which is the result of strategic choices in the context of a competitive struggle (and not a constraint to competition like barriers to entry), is the core of relationship lock-in.**

The remaining argument is (not coincidentally) shared by two dynamic theories of competition (deviating neo-Schumpeterian and Marxian theories) to justify *intra-industry* long-run profit rate differentials

between firms. Firms being heterogeneous in their technological and organizational capabilities, and competition being a dynamic and constantly ongoing process, there is always in a given industry a firm that lags behind the market leader and, therefore, obtains smaller profits. Although the competitive process eventually eliminates underperforming firms, it allows for the coexistence of leader and non-leader firms. This argument is explicitly developed by the authors belonging to the Marxian tradition and less explicitly present in the deviating neo-Schumpeterian theory with the idea of selection being made on a range. In both cases it applies to firms competing on the same market and trying to innovate to become (or remain) market leaders. It is by nature a dynamic competition argument that applies strictly to intra-industry short-run profit rate differentials and does not imply the creation of market power in the sense given by these theories to the term: the profit rate differential is not obtained by pricing above the competitive level but, on the contrary, by innovating and creating a new (lower) competitive price that other firms cannot meet.

As shown in italic in Figure 15, the *sufficient* arguments to explain profit rate differentials through market power mechanisms that would arise from competition (which validates the market power paradox) come down to four: the impermeability of barriers to entry, the possession of rent-earning resources, the conjugation of incomplete contracts and asset specificity that creates a form of relationship lock-in and agent's strategic behavior coupled with relationship lock-in. There is a fifth argument to account for long-run profit rate differentials that does not involve market power (and hence, cannot be used to corroborate the market power paradox) but that it is interesting to consider nevertheless: the heterogeneity of the capabilities of firms in a context of continuous dynamic innovation.

We would like to make two important and overlapping distinctions regarding these arguments. For the first distinction we will paraphrase⁶⁶ Lippman and Rumelt (1982, p. 419) by saying that “a theory explaining the dispersion of firm efficiencies” (...) “must address both the origins of interfirm differences and the mechanisms that impede their elimination through competition and entry”. The mechanisms that impede the elimination of inter-firm dispersion of efficiencies (which translate into long-run profit rate differentials) are the ones in bold letters: relationship lock-in, rent-earning resources, impermeable barriers to entry and the dynamic and continuous nature of innovation. The other mechanisms on the “Yes” side of Figure 15 are the ones that account for the origins of inter-firm dispersion of efficiencies or (consequent) profit rate differentials. Rent-earning resources fall into a middle category, since in many cases they can be both the origin of inter-firm efficiencies (for example, when a firm possesses a performant unique technology) and a mechanism to impede the elimination of this dispersion. This can be

⁶⁶ The quote refers only to intra-industry dispersion of efficiencies.

the case when, for example, a patent on the technology blocks its use by other firm, creating thus a rent and, hence, profit rate differentials.

The second distinction also builds on Lippman and Rumelt's quote but with a slight (yet important) different approach. **In terms of the link between market power and competition present in these mechanisms (both the ones that explain the origin and the sustainability of inter-firm dispersion of efficiencies) we can say that there are two different natures of market power described: market power as an obstacle (either created by a firm or present in the market structure) to current or potential incumbent rival firms' competition (rent-earning resources and barriers to entry coupled or not with concentration⁶⁷) and market power as the strategic obtainment and usufruct of a particular link with other agents as a result of multilateral strategic choices by all of the agents *in a competitive context*. The latter involves relationship lock-in. We will call it "positional market power".**

This distinction leads to the third main conclusion of the chapter: if market power is conceived as an obstacle to competition, long-run profit rate differentials between firms cannot coexist with price competition. This shows the limitation of most existing competition theories in accounting for the current Finance-led form of competition in which, as we saw in Chapter I, high competitive pressure on prices and long-run profit rate differentials between firms of different industries coexist. Indeed, when barriers to entry and rent-earning resources are the only and ultimate explanation of market power used to explain profit rate differentials between firms of different industries (confirming thus the market power paradox), competitive pricing cannot prevail. Symmetrically, if the market power paradox is denied by arguing the irrelevance or the permeability of barriers to entry and rent-earning resources in order to account for competitive pricing, profit rate differentials between firms of different industries cannot exist.

The straightforward way out of this conundrum would be to offer a dual answer to the market power paradox. This consists on arguing that while some firms or industries benefit from impermeable barriers to entry (and, therefore, stable less competitive market structures such as oligopolies or monopolies) and/or rent-earning resources, some other do not. Therefore, competition prevails in some industries/for

⁶⁷ If concentration gives a firm bargaining power, the nature of the market power exerted would be related to relationship lock-in, but its origin would not, because it is only because barriers to entry are not porous that the positional market power that concentration offers can be exerted. This is true also in the particular case where concentration acts as a barrier to entry itself. For example, when concentration reflects high fixed costs in a natural monopoly. This is the reason why we do not include concentration as a kind of relationship lock-in-related market power.

some firms (which would explain the evidence on competitive pricing) but is hampered in others (which would explain the prevalence of long-run profit rate differentials between firms of different industries). This is Milberg's argument, in which vertical profit rate differentials within global value chains in a context of strong price competition are explained by "an asymmetry of market structures through the global value chains, with oligopoly, lead firms, at the top, and competitive markets among the lower-tier suppliers" (Milberg, 2006, p. 11). It is also the deviating neo-Schumpeterian argument that claims that some firms possess rent-earning resources while the general environment remains competitive, which implies a (somehow) general competitive price setting system.

The problem with this argument is that, although it *describes* correctly some concrete phenomena related to competition and market power (the fact that some firms hold rent-earning resources, the existence of unequal distribution of barriers to entry across firms and industries and the coexistence of a "general" strong price competition environment and profit rate differentials between firms of different industries), it does not *explain* them. The argument remains insufficient if a general theory of competition is intended. According to this argument, the market power paradox would hold in some cases and not in others without a coherent comprehensive theory of competition and its link to market power existing to account for this duality. Competition should prevail where competitive pricing exists, but it should not where long-run profit rate differentials between firms of different industries are observed. We would be in a "free pass on competition for some firms" framework where the market power paradox would only hold in some cases for some firms that can manage to elude the forces of market-power-restraining competition. Although it is evident that some firms and industries do enjoy higher barriers to entry than others and/or possess rent-earning resources, the logic question that follows is why do some firms/industries manage to (constantly in many cases) to acquire and maintain these competition-eluding assets and some others do not (Starosta, 2010). Nothing in these two mechanisms can answer that question. **A common logic that would make cutthroat price competition and profit rate differentials between firms of different industries compatible and mutually complementary (and not just co-existent) is a theoretical necessity for the argument to hold. Postulating or assuming the ability of some firms to erect and maintain barriers to entry and/or to obtain rent-earning resources is not a sufficient answer to meet this challenge.**

Hence, the way out of this paradox has to lie in positional market power. Nevertheless, the current theoretical development of positional market power is far from having found an answer to the market paradox and from having met that challenge. In Transaction Cost Theory's approach to the concept of positional market power, the latter is a strategic behavior that takes the shape of opportunistic behaviors in markets in which information is not perfect, agents have bounded rationality, assets complementarity is

high and contract are incomplete. The reliance on opportunistic behaviors by firms to account for market power exertion is problematic. Every market requires a certain amount of trust in order to function (Coriat & Weinstein, 2010), especially when long-run supplier relationships are considered. Opportunistic behavior cannot be the norm. Moreover, the utilitarian value theory and the transactional conception of the firm on which TCT relies (Coriat & Weinstein, 2010) also make inter-industry profit rate differentials incompatible with competitive pricing. Indeed, when a firm is opportunistic and holds-up gains that should belong to another firm, there is “allocative inefficiency” which, in terms of this school’s approach, can only happen when prices are not competitive. **Then, the existent competition theories that consider positional market power also fail to conjugate long-run profit rate differentials between industries with competitive pricing, even when they avoid conceptualizing market power in terms of barriers to entry and/or rent-earning resources (market power as an obstacle to competition).**

This contradiction shows the limitations of competition theories’ theorization of barriers to entry and rent-earning resources, the necessity to reformulate the market power paradox and the need to further conceptualize positional market power. The three are of course related. *Stated as it is*, the market power paradox cannot be answered by relying on the role of barriers to entry and without competition theory having to deny either the prevalence of competitive pricing or the existence of long-run profit rate differentials between industries; or without entering into a dualistic explanation that would admit both phenomena by paying the price of reducing theory to a sophisticated description. We believe that further work on positional market power is needed in order to find a solution to these difficulties.

Hence, the market power paradox has to be reformulated. We will argue that the pertinent market power paradox of the current dominant form of competition should read as follows: competitive behavior results in the obtaining and use of market power by some firms, which renders the competitive landscape... *competitive*. This means that competition theory, in order to be theoretically coherent and consistent with empirical observations, needs to reconcile market-power-originated profit rate differentials between firms of different industries with competition itself, which of course includes (strong) price competition. **The theoretical challenge the restated market power paradox faces consists in conjugating coherently competition and market power not as two opposed concepts where the first would give birth to the second (its self-destruction) but rather as two manifestations of a same process.**

This does not mean we think the ‘old’ market power paradox is uninteresting or that it is a false paradox. What we want to show is that we need to pose a different market power paradox, a new research question, in order to build a coherent and holistic competition theory that can account for today’s characteristic and

relevant competitive mechanisms, their links with market power and its implications. The ‘old’ market power paradox remains as interesting as before, but it is nonetheless not sufficient anymore to understand all the ways in which competition and market power amalgam nowadays.

We believe that the path to overcoming these three difficulties lies in the concept of positional market power. In the next chapter, we will show that this concept does not rely on the concepts of barriers to entry or rent-earning resources (although it is compatible with them) and that it can be used to understand how fully vertical global value chains operate. Furthermore, we will argue that in doing so, it can account for competition and market power exertion mechanisms (including the pricing of inputs) that can explain profit rate differentials between firms of different industries in a context of strong price competition. In terms of the cartography drawn in Figure 14, our contribution to competition theory will be built in the bottom-right quadrant.

The next chapter will therefore intend to offer a theory of the most relevant competitive struggle of our times: fully vertical competition in a vertically disintegrated mode of production. In doing so, will offer an answer to the restated market power paradox. This will imply reconciling competitive pricing with market-power-originated profit rate differentials between firms of different industries and, more generally, to reconcile competition and (a kind of) market power as two sides of the same coin. This particular and extremely relevant type of market power will not be conceived as a denial of competition, not as an obstacle to competition or a byproduct of competitive mechanisms, but as an expression of competition.

Conclusions of Part I

In Part I we have examined the link between market power in American economic history (Chapter I) and in competition theories (Chapter II) in order to find elements to account for the coexistence of the two seemingly incompatible stylized facts that triggered this investigation: strong price competition and long-run profit rate differentials between firms.

In **Chapter I** we showed how American economic history provides evidence of a non-antithetical relation between competition and market power. By expanding the Regulationist concept of form of competition, we identified two forms of competition in the history of the United States in which, contrary to the views according to which throughout history “the balance between monopoly and competition oscillates erratically back and forth” (Harvey, 2014, p. 134), competition has not always simply led to market power or the latter has not always simply taken over the former, as it had been the case during the Predatory Competition (circa 1840s to 1860s) and Constricted Competition (circa 1920s to 1945) forms of competition respectively. In effect, a symbiotic relation between the two has existed. During what we have labelled the ‘Collusive form of competition’ (circa 1870s to 1910s), market power has served to (imperfectly) regulate competition, and in the current hegemonic Finance-led form of competition (circa 1980s to present) market power articulates competition, which results in long-term profit rate differentials coexisting with strong price competition. At the end of the chapter, we offered a general account of how the coexistence of these two stylized facts can be thought of coherently by paying special attention to the role that the current internationally vertically disintegrated landscape of industrial organization plays in competitive dynamics, but without entering into the competition theory that would support our claims yet.

In **Chapter II** we reviewed the existing competition theories focusing on the link between competition and market power they establish. We have seen that, relying on a variety of (anti)competitive mechanisms and concepts of competition, competition theories differ in respect to how they stand on the market power paradox according to which competition necessarily leads to market power asymmetries that result in long-run profit rate differentials between firms. Nevertheless, regardless of theories’ stands on the market power paradox, none has proven to be able to avoid conceptualizing competition and market power as two antithetical concepts. We have shown that the fact that in most of them market power arises from setting *obstacles* to competition makes it theoretically impossible to conciliate long-run profit rate differentials and strong price competition. In some of them, we have identified another type of market power mechanism, ‘positional market power’, which is based on the strategic obtainment and usufruct of a particular link with other agents as a result of multilateral strategic choices by all of the agents in a

competitive context. Although theories relying on positional market power also fail in conciliating the above-mentioned stylized facts, we have suggested by the end of the chapter that positional market power was the key to do it. Moreover, we have highlighted the narrow vertical scope of most competition theories, which do not consider (anti)competitive relations between firms located all along the supply chain (“fully vertical competition”), and we suggested that a theory that does so was needed to conciliate these stylized facts.

The results are interesting in that, while we have identified two periods in American economic history in which competition and market power have not been antithetical, competition theory, which has been strongly influenced by the observation of American economic history, fails to account for them. Moreover, they fail to account for the coexistence of strong price competition and long-run profit rate differentials and the vertical scope of competition characteristic of the current Finance-led form of competition identified in Chapter I. Because most competition theories make the compatibility of competition and market power impossible by definition by presenting the latter as mechanisms that set obstacles to the former, and because positional market power in its current state cannot account for a long-run synergic relations between competition and market power, we can conclude that there is a gap between history and theory regarding the relation between these concepts.

In **Part II** we will proceed to offering some contributions that aim at narrowing this gap. In doing so, we will follow our findings of Chapter II by developing a concept of positional market power that will pay special attention to fully vertical market power.

Part II - Competition and Market power in contemporary capitalism: an analysis of two archetypal situations

Introduction

In **Part I** we have shown that, although there have been extended periods in American history in which market power has served to (imperfectly) regulate (the ‘Collusive form of competition’ era, circa 1870s to 1910s) and articulate (the ‘Finance-led competition’, circa 1980s to today) competition, the existing competition theories, built to a large extent on the experience of American economic history, continue to present these two concepts as antithetical. As a consequence of this conception of the link between competition and market power, the existing competition theories are unable to account for both strong price competition and long-run profit rate differentials between firms, two stylized facts that we have identified as proper to the current Finance-led form of competition.

Moreover, two recent major changes that challenge the traditional antithetical link between competition and market power have taken place since these theories have been developed: the rise of global value chains, on the one side, and what is nowadays more and more defined as "platform capitalism", on the other side; two novelties that are far from being unrelated. Let us develop these points.

Beginning in the 1990s, the liberalization of trade and the advances in ICT made possible “the integration of trade and the disintegration of production” (Feenstra, 1998) through internationally-dispersed supply chains (global value chains) that have profoundly altered market structures and firms’ strategies. Through the rise of global value chains, competition has become global and fiercer but, at the same time, market power asymmetries have developed within global value chains. More recently, further developments in ICT and the increasing penetration of the internet and smartphones opened the door to an organizational revolution: the rise of the platform economy, a term that covers all the organizations in which data-fed algorithms (platforms) are at the core of the business model. This revolution has also profoundly altered market structures through the disintermediation brought about by platforms in several industries (e.g. retail, transportation, and lodging, to name a few) and the competitive strategies of both platforms and traditional firms. As in the case of global value chains, the platform economy has intensified competition and, at the same time, created new forms of market power.

Building on the findings of Part I, **Part II** will be devoted to offering contributions to make strong price competition and long-run profit rate differentials theoretically compatible. In order to do so, each chapter will focus on the two above-mentioned organizational objects that, to our understanding, have altered the most the link between competition and market power and, therefore, can shed some light on how can long-run profit rate differentials and strong price competition be compatible: global value chains and the platform economy. Because the latter comprises a series of distinct types of firms, we will narrow our object of study to a specific type of platform that has to date altered the most market structures and firms' strategies, 'trust-based algorithmic coordination firms' (TBACF), a label we have chosen to describe platforms of which Uber and Airbnb are the most well-known examples.

Chapter III examines the link between competition and market power in global value chains. After doing a brief review of the genealogy of the concept and pointing out its limitations, we offer an evolutionary theory of the internationally-dispersed network-firm (aka global value chain) in which market power is constitutive of the network-firm. This will be the cornerstone to develop at the end of the chapter contributions to a competition theory within and between global value chains in which, as shown in Chapter I, market power articulates competition in such a manner that strong price competition and long-run profit rate differentials between firms of different industries are compatible.

Chapter IV revisits the link between competition and market power in a specific type of platform-firm that we will label 'trust-based algorithmic coordination (TBAC) firm, and of which Uber and Airbnb are the most well-known examples. After quickly reviewing the technological and institutional transformations that led to the emergence of the platform economy of which TBAC firms are part, we characterize them following an evolutionary theory of the firm. This sets the cornerstone of a competition theory between TBAC and incumbent non-platform-firms, on the one side, and between TBAC firms, on the other side. In both cases, we will show how market power articulates price competition and, in the second case, we will offer a case study of the ride-hailing firm Uber in some of the main American markets to support one of the main theoretical arguments made in the chapter, namely the existence of winner-takes-all dynamics in markets in which TBAC firms participate.

While the two chapters differ significantly in the organizational objects on which they are centered, they form a unity both in methodological and theoretical terms. Methodologically, in both chapters we begin by proposing an evolutionary theory of the firm on which the contributions to competition theory that follow build. Theoretically, they both offer a competition theory in which market power articulates competition and, as a consequence, long-run profit rate differentials are compatible with strong price competition.

Chapter 3: Contributions for a theory of competition and market power within and between global value chains

“You know what capital is? You think it’s something you own, don’t you. You think it’s factories and machines and buildings and land and things you can sell and stocks and money and banks and corporations. (...) But you are mistaken. Capital is controlling things. Controlling things.”

Reverend Bacon, *The Bonfire of the Vanities*

Introduction

In Chapter I we have seen that vertically-disintegrated production of goods by firms spread around the world (a phenomenon that, since the 2000s, came to be known as “global value chains”) has become the dominant form of industrial organization from the 1980s on. Moreover, we have seen that the new form of competition that emerged with the surge of global value chains is characterized by two salient stylized facts: long-run profit rate differentials between firms of different industries and strong competition on prices.

Looking for an explanation of these two stylized facts, in **Chapter II** we have reviewed the existing competition theories and concluded that none could conciliate them. Moreover, noticing that very few competition theories take a fully vertical dimension in their scope despite the relevant role played by global value chains in the current Finance-led competition form described in Chapter I, we suggested that the way to make these two stylized facts compatible in a coherent competition theory would be precisely to build a competition theory that has a full vertical scope, which comes down to developing a theory of competition within and between (we will show why the ‘between’ is necessary in Section 3) global value chains. **The goal of this chapter will therefore be to set the basis for a theory of competition and market power that, taking global value chains as its objet, can make long-run profit rate differentials between firms and strong price competition compatible.**

Before starting developing in that direction, we should begin by examining a body of literature that has taken global value chains as its object of study. Although these literatures are not competition theories *per se*, they address some aspects of interest for our investigation. Therefore, in **Section 1** we will study, for the different variants of those literatures (namely Commodity Chains, Global Commodity Chains and Global Value Chains in its mainstream and ‘market power’ versions), what competitive mechanisms exist and how they explain profit rate differentials between tiers of a value chain.

After showing that, just as it is the case of the competition theories studied in Chapter II, none of these literatures can conciliate long-run profit rate differential between firms of different industries (tiers) and strong competition on prices, we will proceed to developing our theory of competition within and between global value chains. **Section 2** will begin by exposing an evolutionist theory of the network-firm, a term that applies to both ‘national’ network-firms and ‘international’ network-firms, i.e. global value chains. We will show how *de facto* power, by assuring the coordination and defining the borders of the network-firm, constitutes its backbone. **This will be the pillar of our theoretical explanation of long-run profit rate differentials between firms in the context of global value chains in the following section.**

Section 3 will build on the findings on the previous section and introduce the concept of ‘net independence’ to account for the source of the *de facto* power that some lead firms have within global value chains. We will begin by explaining how it translates into pricing mechanisms that result in profit rate differentials between firms of different industries (tiers). Then, using numerical examples and building on some concepts from network theory, we will show how this market power mechanism is compatible with the two competitive forces that operate in a global value chain context in the short-run: ‘traditional’ horizontal price competition and ‘network-firm vs network-firm’ competition. In this way, **by the end of Section 3 we will have reached the goal of this chapter by having shown that long-run profit rate differentials and strong competition on prices are compatible in an industrial organization landscape dominated by global value chains.** For these reasons, our thesis is to be considered not simply a vision of competition within and between global value chains, but rather a contribution to a theory of competition *and market power* within and between global value chains. In this sense, the results obtained in Section 3 will provide elements for a competition-theory-grounded explanation of the coexistence between competition and market power we have identified in Chapter I when analyzing the current Finance-led form of competition. Then, by developing a contribution to a theory of competition and market power, this chapter will reinforce the main conclusion we have reached in Chapter I when we analyzed the history of capitalistic forms of competition in the United States: competition and market power are not necessarily incompatible; just like during the collusive competition

era (1870s to 1910s), although in a different manner, in the current Finance-led form of competition (1980s to present) in which global value chains predominate, market power can *coordinate* competition.

Finally, **Section 4** will take the implications of our findings of the previous sections a step further by introducing an additional competition force that plays in the long-run in a global value chains context: competition for fully vertical market power. We will first show how make-or-buy and innovation decisions can be understood as long-run strategic choices by firms trying to occupy or create the role that gives them more fully vertical market power within the global value chain. We will finally point out how institutional change can also be interpreted in the same way.

1 Global value chains: genealogy of an eclectic concept

Since the 1980s, the dominant form of production and international trade started to change towards what Feenstra (1998) has cleverly summarized as “the integration of trade and the disintegration of production”. As we have seen in Chapter I, around those years a series of technical progresses made possible the spreading of modular production to many industries. At the same time, international trade was liberalized and technological progress reduced communication and transportation costs. This allowed for a new international division of labor in which, following a modular form of production, firms spread around the globe started exporting inputs to subcontracting firms located in other countries and re-importing final products. **The novelty of the phenomenon did not rely in modular production alone but rather on its international dimension.**

Many scholars identified this novelty and started to build new theoretical frameworks to understand it. One of the earliest has been the New International Division of Labor (NIDL, or ‘DIPP’ in its French version, which brought about many contributions to the field) that started to develop in the 1980s (Fontagné, 1989; Lassudrie-Duchene, 1982; Mouhoud, 1993). The goal of this body of literature was to understand why this new international division of labor was taking place and what criteria were these new networks of firms following to choose what stage of production they would locate in which country. Two conflicting explanations were put forward to account for the latter: a Neo-Ricardian one based on the comparative advantages certain countries or regions offer for certain stages of production (low wages, an advantageous geographical position, infrastructures, market potential, etc.) and a cognitive one, in which short-run cost minimization is not the goal of locating a stage of production in a particular country, but rather the mastering of a specific productive knowledge and the ambition to remain at the technological edge (Moati & Mouhoud, 2005). Nevertheless, the NIDL approach did not focus on competitive mechanisms or the unequal distribution of profits within the nascent international network-firms, two topics central to our investigation to which the different versions of the Global Value Chains literature devoted itself.

As the NIDL approach was being developed, another body of literature looking at the same object but with different questions arose, the Commodity Chains approach. This concept was born within the World-Systems Theory, a macro-scale multidisciplinary framework influenced by Dependency Theory that privileges the world as a system as its unit of analysis of long-run social change rather than nation states. In this vein, during the 1980s the term ‘commodity chains’ was coined to designate “a network of labour and production processes whose end result is a finished commodity” (Hopkins & Wallerstein, 1986, p. 159). It is important to point out that this definition of a commodity chain, while vague, includes

explicitly labor as one of its components. Consequently, and given the Marxist roots of this approach, the analysis of commodity chains includes the modes control and reproduction of labor that are found in a node or ‘box’ in the original terminology (Bair, 2009). The commodity chains approach sees the latter not as a novelty of the last quarter of the XXth century but as a phase of *longue durée* cycles. In Wallerstein’s words, “transstate, geographically extensive commodity chains are not a recent phenomenon, dating from say the 1970s or even 1945, ... they have been an integral part of ... the functioning of the capitalist world-economy since it came into existence in the long sixteenth century” (Wallerstein, 2000, p. 2). Hopkins and Wallerstein (1994) see that some tiers of the commodity chain benefit from market power because of the more technologically advanced processes they involve and the barriers to entry that have to be overcome to enter them. Similarly, Gereffi and Korzeniewicz (1994, p. 2) wrote that “within a commodity chain” (...) a relatively greater share of wealth generally accrues to core-like nodes than to peripheral ones. This is because competitive pressures are less pronounced in core-like nodes than in peripheral ones”. Nevertheless, the commodity chains approach, which is also influenced by Schumpeterian views on competition (Raikes, Friis Jensen, & Ponte, 2000), considers that in the long-run competition is cyclically restored. According to this view, during expansionary phases of Kondratieff cycles driven by radical innovations, commodity chains become more vertically integrated and monopolistic concentration among tiers is reduced. Symmetrically, during the contraction phase of the cycle fiercer competition eliminates weaker firms and concentration increases, while vertical disintegration takes place in order to reduce costs by replacing labor and capital costs by contractual relations.

A decade later, in the 1990s, an evolution of this approach took place around the concept of ‘global commodity chains’ (GCC). This approach let behind the historical and cyclical concerns of the Commodity Chains approach and conceptualized commodity chains as forms of coordination of production and international trade. Indeed, these authors considered that, since the 1980s, not only was production being internationally fragmented, but also that it was being shaped and driven by “chain management” strategies by leading multinational firms using a series of market and extra-market forms of coordination (Gereffi, Humphrey, & Sturgeon, 2005). The goal of the GCC approach aimed at understanding how production and international trade is organized within GCCs. Not surprisingly, among the three dimensions Gereffi (1994) identified to analyze a GCC (input-output structure, territoriality or “geographical configuration” and governance structure)⁶⁸, the governance structure became the central one in GCC studies. The GCC approach identified the governance of GCCs with the concept of

⁶⁸ A year later Gereffi, Humphrey and Sturgeon (2005) added a fourth dimension: institutional context. The latter refers to the “rules of the game” that apply to the organization and operation of GCCs.

“driveness”, which refers to by which means a lead firm can assure the coordination of the internationally dispersed production process through both market and non-market means. Influenced by the insights of management literature developed by Porter (1986), they identified “higher-order” factors of competitiveness that make a firm the leader or coordinator of a GCC, such as “proprietary technology, product differentiation, brand reputation, customer relations and constant industrial upgrading” (Gereffi, Korzeniewicz, & Korzeniewicz, 1994, p. 6). The factors that allow a firm to drive a GCC also allow it to appropriate more value than firms located in other tiers. Indeed, difficult to imitate resources (research and development, marketing, selling capacity, knowhow of a productive process, privileged access to a primary commodity, etc.) allow a firm to appropriate larger shares of the value created along the value chain (Gereffi & Korzeniewicz, 1990, 1994; Lee, 2010). Then, low degrees of competition and high degrees of innovation (the latter being ultimately linked to difficulty of replicability of a resource, and therefore to weak competition) in certain tiers allow the firms that can occupy them the possibility of governing the GCC and appropriating more value than others. Consequently, the famous distinction between “producer-driven” and “buyer-driven” GCCs was made. In the former, common in industries such as automobile and aircraft, there are barriers to entry in high-technology and large-scale production facilities that are characterized by scale economies and large sunk costs. Therefore, the key agent of the GCC is located upstream. Symmetrically, in buyer-driven GCC, common in industries such as garments, toys or footwear, barriers to entry are low at the manufacturing stages but high downstream. Key agents control design and marketing, using their brands and commercial networks to obtain a high share of the value created within the GCC, while production is subcontracted (Raikes et al., 2000). In sum, as Gereffi and Lee (2012, p. 25) point out, “governance is the centerpiece of GVC analysis. It shows how corporate power can actively shape the distribution of profits and risk in an industry”.

In the 2000s, the authors that had been at the forefront of the concept of GCC (Gereffi, Sturgeon, Korzeniewicz, Lee, etc.) advanced a new version of it they labelled “global value chains” (GVCs). The object of study and its definition remained the same, namely “the nature and extent of the inter-firm relationships that bind sets of firms into larger economic groups” typically centered on the “sequence of events leading to the delivery, consumption and maintenance of goods and services” (Sturgeon, 2001, p. 10). As this definition shows, both the GCC and GVC approaches focused on inter-firm relationships, neglecting the labor process, which had been at the center of the Commodity Chains approach. Although the switch from “commodity” to “value” was meant to clarify that the term “global value chains” not only refers to primary products or low-value-added goods (which are usually referred to as “commodities”) and to include similar undergoing theoretical constructs (Bair, 2009), some important evolutions

regarding the foundations of competitive dynamics and profit rate differentials in GVCs occurred when the term “global value chains” was adopted.

The turning point was the passage from the binary distinction between buyer-driven and producer-driven governance modes to the five governance modes that characterize the GVC approach. In this framework, power asymmetry within a GVC (and, therefore, the ability of a firm to capture more value than other firms of its GVC) depends on the degree of explicit (i.e. non-market) coordination. The latter, in turn, is the function of the combination of three variables: the complexity of transactions, the ability to codify transactions and the capabilities in the supply base. The combinations of these three variables create three GVC governance forms⁶⁹: modular, relational and captive. The three of them have complex transactions that require some degree of non-market coordination. Following transaction costs theory, the GVC framework argues that the more complex exchanges and the higher the risk of hold-up derived from specific investment are, the more costly it is for firms to exchange in the market, and therefore the more likely a departure from a pure market governance will be. Nevertheless, there are ways to mitigate these transaction costs that explain why these hybrids between ‘pure market’ and full vertical integration named global value chains exist in three variants of “governance forms”.

On the less explicit coordination side of the spectrum of GVC governance forms, the modular form is characterized by high complexity of transactions, a high ability to codify transactions and a high capability of the supplier base. The ability to codify transactions, typically by using technological standards, “reduces asset specificity and therefore a buyer's need for direct monitoring and control” (Gereffi et al., 2005). Moreover, the high capability of suppliers allows for outsourcing without much explicit inter-firm coordination, although this coordination certainly exceeds the mere exchange of information on prices that characterizes pure market transactions. In relational value chains, transactions are also complex and the capabilities of the supply base are also high, but transactions cannot be easily codified. The competences of the supply base provide incentives to outsource to gain access to complementary competencies, but the low codifiability of transactions forces firms to engage in a more explicit coordination. Finally, in captive value chains, the complexity of transactions is high, but because transactions are highly codifiable, the lead firm can give precise instructions on how to produce instead of having to internalize production completely. In captive value chains, the capability of the supply base is low, which encourages lead firms to intervene and control. This creates transactional dependence on the lead firm by suppliers.

⁶⁹ The other two, market and hierarchy (i.e. full vertical integration) are not GVCs, which is why we do not develop on them here.

The degree of power of lead firms relies on the degree of explicit coordination they assume towards other firms of the value chain. The latter, in turn, is the result of both characteristics of the transactions (complexity and ability to codify transactions) and the capabilities of the firms involved in the production process. When the difficulty of codifying transactions leads to explicit coordination, it is the risk of the hold-up that could arise from asset specificity that motivates the explicit coordination that gives the lead firm power, as in the relational governance type. In this case, power is founded on a transaction costs theory of the firm. On the contrary, when, as in the captive governance type, the low capabilities of suppliers are what motivate explicit coordination, there is a cognitive theory of the firm at the foundation of power. In this sense, **the GVC approach can be considered an eclectic approach in terms of the theory of the firm that underlies it.**

Finally, a fourth generation of the GVC approach in terms of competitive dynamics and profit rate differentials within value chains has recently emerged with the work of Milberg and Winkler. Closer to the initial Commodity Chains approach, Milberg and Winkler claim that an asymmetrical concentration of market power along the value chain is the reason why there is an uneven distribution of value between the tiers of the value chain. Contrary to the Global Commodity Chains approach, this power does not result from the characteristics of the industries in terms of the capabilities that are more relevant and intrinsically shielded from competition in certain value chains that explained buyer-driven and producer-driven commodity chains, but rather from *strategies* deployed by lead firms. Departing from a Kaleckian pricing theory, they argue that, because raising final prices has become more difficult as a mean of exerting monopoly power, firms recur increasingly to exerting downward pressure on input prices instead in order to enlarge their mark-ups. Their ability to do so relies on “an asymmetry of market structures through the global value chains, with oligopoly, lead firms, at the top, and competitive markets among the lower-tier suppliers” (Milberg, 2006). The power of lead firms to exert downward pressure on input prices is applied through four mechanisms Milberg and Winkler (2013, pp. 123–128) identify: 1) inducing competition among suppliers; 2) offloading risks to suppliers; 3) erecting entry barriers through branding and 4) minimizing technology sharing. Moreover, they consider that a factor helping in “sustaining the asymmetry is the persistence and growth of global excess capacity in many industries” (Milberg & Winkler, 2013). This causes a downward pressure on prices that helps lead firms erecting and maintaining barriers to entry while benefiting from inputs that become constantly cheaper in their value chains (Milberg & Winkler, 2013, p. 129). It is worth mentioning that, unlike the Commodity Chains approach, Milberg and Winkler do not consider global value chains to be something that has existed for as long as capitalism has and, more importantly in the context of this section, do not think that successive B-phases of Schumpeterian economic cycles restore competition in GVCs. On the contrary, they believe the

barriers to entry set by lead firms are difficult to erode. It is for that reason that we consider Milberg and Winkler's a fourth generation of the GVC concept in terms of competitive dynamics and profit rate differentials within the value chain.

Two main conclusions can be drawn from the rapid review of competitive dynamics and explanations of intra-value-chain profit rate differentials in the different phases of evolution of the global value chain concept. **First, the poor and/or eclectic theoretical foundations of many of these approaches, especially regarding the theory of the firm, has made of "global value chain" and its neighbor concepts a fuzzy term both in terms of its definition and its frontiers.** As Raikes, Friis and Ponte (2000, p. 10) point out, is a GVC "just any channel, or set of channels, by which produce crosses the world, or should the notion itself include the specific power and governance structures seen by Gereffi to define GCCs?"⁷⁰. Moreover, where is the frontier of a GVC to be drawn? How far in the production process should one go to determine where one GVC starts and where the other ends? The existing definitions, a handful of which we have quoted in this section, provide no answer to this question⁷¹. Second, as we have shown along this section, **none of the variants of the GVC approach can make compatible long-run profit rate differentials between tiers and competitive pricing.** In the best case, competitive pricing exists only in certain tiers (Milberg, 2006; Milberg & Winkler, 2013) or in certain periods of the economic cycle (Wallerstein, 2000). This is due to the fact that, just like most of the competition theories examined in Chapter II, the different versions of the GVC approach recur to a concept of market power as an obstacle to competition (concentration, product differentiation or rent-earning resources) to account for profit rate differentials between firms.

Therefore, the GVC framework, in all its versions, is not adequate to fulfill the goal of this chapter, namely to develop the basis of a theory of competition that takes global value chains as its object and can account for both long-run profit rate differentials between firms of different tiers (industries) and strong competition on prices. Consequently, we will begin to do so in the next section by analyzing global value chains from the perspective of an evolutionist theory of the firm. This will be the foundation on which we will rely to develop our contributions in Sections 3 and 4.

⁷⁰ The quote refers to GCCs, but the criticism applies as well to GVCs and commodity chains.

⁷¹ For a detailed review of the existing definitions of a GVC and how they fail to clearly delimitate the boundaries of a value chain see Carballa Smichowski, Durand, & Knauss (2016).

2 De facto power as the backbone of the network-firm: an evolutionist approach to global value chains

We have seen in the previous section that, just like the competition theories examined in Chapter II, the GVC literature and its neighboring variations are incapable of making long-run profit rate differentials between firms and strong price competition compatible. Therefore, as mentioned in the introduction, we will have to develop our contributions to a theory of competition and market power within and between global value chains to meet that goal. Moreover, we have seen that because of the poor theoretical foundations or the eclectic theory of the firm that underlies the GVC literature and its neighboring variations, they lack a clear and consensual definition of what a GVC is and where its boundaries are to be drawn. **Since such a definition is essential to building a theory of competition and market power between and within global value chains that can make long-run profit rate differentials and strong price competition compatible, we will devote this section to developing an evolutionist conceptualization of global value chains.**

In this section we will conceptualize global value chains as globally-disperse network-firms. This conceptualization, which draws from an evolutionary theory of the (network) firm, places *de facto* power at the core of the network-firm. **The central role that *de facto* power plays in organizing the production process in the network-firm will be basis on which we will develop contributions to a theory of competition and market power within and between global value chains in the next section. In doing so, we will offer the explanation this chapter aims at providing: how can long-term profit rate differentials be compatible with strong price competition.**

As explained in Chapter II, evolutionary economics considers firms to be an organization that, as such, is characterized by its (unique) repertoire of routines (Nelson & Winter, 2004) understood as organizational automatized responses to wide-ranged problems on which firms' competences are built. The latter are "idiosyncratic, difficult to imitate, often only incrementally changing over time" (Dosi, 2012). Moreover, the routines and the organizational or technological knowhow that characterize a firm are largely tacit, which makes them difficult to transfer (Coriat & Weinstein, 2015, p. 130). Then, not only are firms are heterogeneous, but their heterogeneity also remains through time.

Moreover, heterogeneity in time and the evolution of firms follows a rationale given by the very nature of the firm. The firm learns as a result of "experience and experimentation" (Dopfer & Potts, 2014). Routines, usually said to play the role genes play in biological evolution, are different to the latter in one fundamental aspect: they can be consciously (yet slowly) modified by the firm as an answer to its

interaction with the economic environment. In order to do this, firms use their “meta-routines”, which are the routines in charge of the modification and adaptation of lower level routines (Nelson & Winter, 2004). Nevertheless, routines cannot change in any way and, more importantly, their change depends on the history of the firm. Path dependence (the recognition that “history matters”) plays a central role in evolutionary economics. At the firm level (and regarding competition theory), path dependence implies that “a firm’s previous investments and its repertoire of routines (its ‘history’) constrains its future behavior” (Teece, Rumelt, Dosi, & Winter, 1994, p. 17).

In other words, firms are unique problem-solving devices equipped with competences, and that uniqueness is to remain through time and evolve based on firms’ past repertoire of routines. Uniqueness should not be mistaken with exclusiveness: each firm can be unique and, at the same time, two or more firms can offer similar responses or equally efficient responses to the same problem. This will be important in building our contributions in this chapter in that, although many competing firms can offer similar products or services to other firms or final customers, in the short and medium-run the set of firms that can offer that product or service remains unchanged. **In a context of vertical disintegration and modular production, this means that firms that participate in a network-firm need each other’s complementary competences⁷² to be able to deliver a final product with a quality and/or at a price that is competitive. Mutual dependence between firms of different tiers of a same value chain is therefore the norm.**

The question that follows is how firms coordinate to pool their complementary competences together. In other words, how do a set of firms become a network-firm? Chassagnon offers an answer in his definition of the network-firm:

“The network-firm refers to a productive entity that unifies a set of legally independent firms, vertically integrated and coordinated by a main firm called the hub-firm, in order to produce a specific good or service. The distribution of power between actors is the main coordinating mechanism in a vertical network of production.” (Chassagnon, 2009, p. 24)

Power, in turn, has three sources that act within the boundaries of a firm (Chassagnon, 2010, 2011): formal authority (the power employers have over employees resulting from the employment contract), *de*

⁷² We can define complementarity as “the extent to which two mutually adapted factors can yield superior value in combination” (Jacobides, Knudsen, & Augier, 2006, p. 1201).

jure power (the power that comes from private and exclusive property rights held on assets⁷³ and gives an agent the power to exclude another agent from using them) and *de facto* power, which comes from resource dependence. The latter differs from *de jure* power in that it “does not strictly result from contractual and legal mechanisms but from an informal mechanism: *access to critical resources*” (Chassagnon, 2009, p. 17, emphasis added). This does not mean that access to critical resources cannot and is not put into contract clauses. Nevertheless, one could take the logic further and question why a contract clause between a firm and a subcontractor would benefit more the former than the latter. Power is *reflected* in contracts but it is not *explained* by them when dealing with two legally independent firms. Moreover, it goes without saying that formal authority is not the source of power between two legally independent firms. The source of power that glues the network-firm together is then *de facto* power. According to Chassagnon (2012, pp. 25–26), “the complementarity of critical resources generates synergy that creates a systemic interdependence peculiar to the network-firm. Each legal entity of the network is in situation of economic dependence with each other, which requires compliance between actors (...) The exploitation of *de facto* powers is hence at the origin of the emergence of the network-firm. In the latter, informal aspects form the ‘glue’ that unifies some legally independent firms into a single production process”.

In other words, in an industrial organization landscape in which, as shown in Chapter I, complementary competences are vertically scattered across different legal entities, and in absence of formal power, *de facto* power is the mechanism through which legally independent firms coordinate in order to pool together their complementary competences to produce a final good or service; through the means of *de facto* power, problem-solving devices are federated to constitute a mega-problem solving device that the network-firm is. *De facto* power can be (imperfectly) translated into inter-firm contracts (franchising, subcontracting, licenses, joint ventures, alliances, etc.) and act through contract law, which makes it manifest as *de jure* power. However, the source of power within the network-firm remains *de facto* power. It should be noted that the fact that *de facto* power is the underlying coordination mechanism of the network-firm does not mean that conflict is the only mean through which legally independent firms coordinate within the network-firm. *De facto* power is what glues firms together and implicitly distributes hierarchies within the network-firm, as we will see in more detail in Section 3. Relative power positions within the network-firm affect the conditions of cooperation and informally enforce them. Nevertheless, the actual cooperation that takes place in this power-based background occurs through a mix of market mechanisms (price signals, bargaining) and a form of

⁷³ Chassagnon (2012) writes “property rights of physical assets” while we would like to also include intangible assets.

hierarchical control that transcends the legal boundaries of the firms that constitute the network-firm or “supply chain”. In Dosi et al’s (2007, p. 31) words:

“Division of labour and decentralization associated with the expansion of the network require at the same time stronger integration and coordination within the nodes of the network. As some activities are outsourced, their coordination implies the development of highly structured functions dedicated to their management and to the achievement of coherence and integration. In other words, division of labour does not simply reduce the need for managerial control, but shifts it at different levels. Thus, the management of supply chains does not eliminate the need for hierarchical control. If anything, it changes its nature and its practices. But one could legitimately argue that the management of supply chains is a more organizationally complex activity than straightforward vertical integration. In this perspective, the Visible Hand is not disappearing. Perhaps the grip of its fist is relaxing. But its strength is not weakened: its grip is perhaps smoother but firmer.”

In this sense, the network-firm constitutes a unique form of organization of production distinct from the ‘pure’ market-based coordination mechanisms and the exclusively hierarchical ones on which the division of labor within the boundaries of the firm is based. It is “a dynamic network of capabilities” (Chassagnon, 2011) glued together by power relationships that manifest through coordination mechanisms that include repeated and sustained (Lamoreaux, Raff, & Temin, 2003; Sabel & Zeitlin, 2004) managerial and market-based interactions between legally independent firms.

Our main interest in the underlying power relations that glue together the network-firm is nevertheless linked to the fact that **when a firm has considerable power over others, it can influence the mechanisms of coordination of production (either by defining them, controlling them or both), the production process (technology, labor standards, etc.) and the distribution of value and risks within the network-firm** (Bair & Palpacuer, 2015).

Identifying *de facto* power as the coordination mechanism of the network-firm is also of relevance to delineate its boundaries. Although the literature on the network-firm, global value chains and its neighbor concepts is large, definitions of a network-firm or a global value chain generally do not address the question of its boundaries (Carballa Smichowski, Durand, & Knauss, 2016). **We argue along with Chassagnon that “the economic perimeter of the network-firm transcends the legal boundaries of the firm stricto sensu and can be circumscribed by the perimeter of power exploitation”** (Chassagnon, 2009, p. 23). **More precisely, we argue that the boundaries of the network-firm are reached when a vertical relation between two firms is not subject to any firm’s (either one of the**

two or a third firm belonging to the same network-firm) influence in terms of the coordination and the nature of the production process and, therefore, price mechanisms become the only coordination mechanism (Powell, 2003; Carballa Smichowski, Durand, & Knauss, 2016). This follows Benkler's definition of being "in" a (generic) network. According to Benkler, an agent is in a network if its behavior, outcomes and configurations are affected by it (Benkler, 2011). A good example to assess the boundaries of the network-firm is the purchase of primary products to be used as inputs. When a firm buys a barrel of oil to use it as energy in a plant, its relation with the oil-selling firm relies exclusively on price mechanisms. The two firms might negotiate the price and the conditions of delivery and bargain power can be uneven, but neither the coordination nor the nature of their production processes will be influenced by that transaction. Then, oil-selling firms are not part of the network-firm(s) of which the buying companies participate. On the contrary, when a firm gives a subcontractor a blueprint to manufacture a part of a car following a specified production process and coordinates the work of other subcontractors to assure the final assembly and the delivery to clients, these firms, even if they are legally independent, can be considered to be part of the same network-firm.

Following this logic, we can conceptualize global value chains as globally-dispersed network-firms.

In other words, global value chains can be defined as networks of firms producing different stages of a product coordinated by the *de facto* power the lead firm(s) has (have) as a consequence of the mutual and uneven interdependencies that exist between the participants of the network. Interdependence, in turn, is the result of different firms of the network possessing complementary critical resources.

A question that remains to be answered is what makes a resource critical or, moving on to a non-binary analysis, what defines how critical a resource is and, therefore, how much *de facto* power a firm holds within the network-firm. In the next section we will investigate in-depth the concept of *de facto* power that arises from critical resources and we will show it can be made the pillar of a theory of fully vertical market power that, in the context of the network-firm, can make high competitive pressure on prices and long-run profit rate differentials between firms of different industries compatible.

3 Short-run competition and market power within and between network-firms

In this section, we will develop a theory of competition and market power within and between network-firms that is rooted in the findings of the previous section. In subsection 3.1, the concept of *de facto* power within a network-firm will be developed into a more precise one that we will denominate "net

independence”. The latter will help us operationalizing the concept of *de facto* power and showing how it can explain profit rate differentials within a network-firm. In subsection 3.2, we will show how this form of market power is compatible with two competition forces that operate in the short-run in the context of the network-firm: traditional horizontal competition and network-firm vs network-firm competition. **Therefore, by the end of Section 3 our objective for this chapter consisting in providing contributions to a theory of competition and market power between and within GVC that can make long-run profit rate differentials between firms and strong price competition compatible will have been met.**

3.1 Net independence as the source of intra-network-firm market power

In this subsection, we will develop the concept of *de facto* power within a network-firm to show how it can be operationalized to account for profit rate differentials within a network-firm. Subsection 3.1.1 will be devoted to a theoretical approach that will depart from the concept of *de facto* power to develop it into the more precise concept of “net independence” that we will introduce. In subsection 3.1.2 we will use a graphical representation that, based on some basic concepts of network theory, will help us operationalizing the concept of net independence so that profit rate differentials within a network-firm can be explained by it. Then, subsection 3.2 will show how profit rate differentials within a network-firm can be compatible with strong price competition, reaching so the goal of this chapter.

3.1.1 A theoretical approach

As said in Section 2, the network-firm is glued by interdependence relationships between firms that interact both through the means of cooperation and power exertion (Baudry & Chassagnon, 2012). We define power independently of its source as “an effect one entity can have on another within a system that will influence that other entity’s actions or outcomes” (Benkler, 2011, p. 4). Power is then “never the property of an individual; it belongs to a group and remains in existence only so long as the group keeps together” (Arendt, 1970, p. 44). In this case, the entities are the firms and the group is the global value chain or network-firm. Following the findings of organizational theory, Chassagnon tells us that “in an organization, **the distribution of power is based on the pattern of interdependencies amongst actors’ resources and activities**” (Chassagnon, 2009, emphasis added). It is important to point out that interdependences are not limited to direct commercial transactions between two firms. A change in production standards, prices or quality in one tier, for example, affects the whole network and, therefore,

might even have an impact on competitive dynamics between two network-firms. In Chassagnon's (2012, p. 25) words: "owing to the dependence between the members of a network, power is more widely dispersed and accrues to key actors having made specific investments around a critical resource of the network-firm. The complementarity of critical resources generates synergy that creates a systemic interdependence peculiar to the network-firm. Each legal entity of the network is in situation of economic dependence with each other, which requires compliance between actors". Harvey and Randles (2002, p. 19) push this logic further by saying that "power asymmetry and mutual dependency extends beyond the immediate exchange process between any two classes of economic agent to relative power positions of all classes of economic agent involved in a nexus of interdependent exchange process on either side of any given exchange process". Moreover, not all firms are equally important to the production process. While some perform a simple task that requires little interaction with other firms of the network-firm, others play more relevant roles such as being the hub firm that has the complex task of integrating other firms' previous work (Baudry & Chassagnon, 2012).

The question that follows is what determines the level of interdependencies in the power fields that network-firms are. We know that, in a network-firm, firms cooperate by producing together with their complementary resources or, more broadly, competences. **But what makes a resource "critical" in a network-firm? What is the ultimate source of *de facto* power within the network-firm?** So far, the answers from theories that have studied the network-firm or global value chains have been constrained to concentration, barriers to entry or to a case-by-case appreciation of the degree of specificity of an investment a firm makes to produce with another. The latter is a transaction cost economics explanation that ultimately relies on lock-in effects, which are barriers to exit. In all cases, the explanations are based on market power mechanisms in which market power is considered as an obstacle to competition (cf. Chapter II).

Our answer is that a firm's "net independence" (i.e. how much other firms of the network-firm depend on it vs how much it depends on other firms of the network-firm) is determined by how essential that firm is for the network-firm to be able to resist competition from other competing network-firms relative to other members of its network-firm. In other words, a firm's net independence is determined by how much the network-firm's competitive position in face of other competing network-firms would be affected if that firm stopped participating in it, relative to how much the network-firm's competitive position would be damaged if other members of its network-firm did the same. **The impact of one firm leaving a network-firm, in turn, depends on how many tasks of the production process depend on the firm's intervention in it relative to other firms of the network-firm, i.e. on how essential the firm is to the network-firm's production process.**

3.1.2 A graphical representation

By recurring to some basic concepts of network theory, we can graphically translate a firm's "net independence" as its centrality in the network (-firm) relative others'. In order to do so, we will first present the elements of the visual representation we will use along this chapter to expose our thesis hereafter.

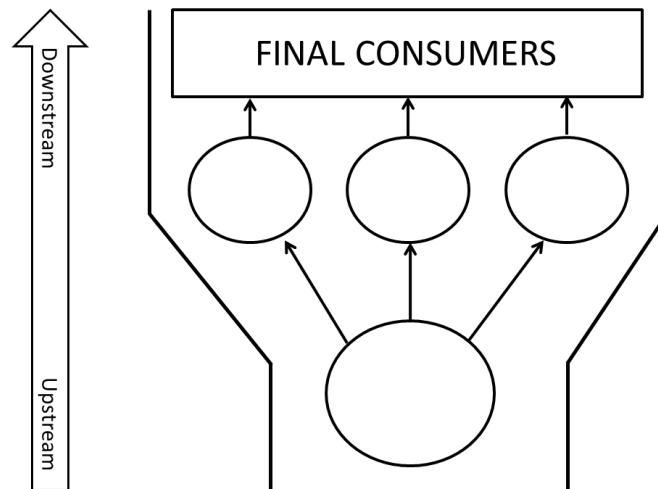
Firms are denoted by nodes (which are graphically represented as circles) and commercial transactions⁷⁴ between them (selling/buying a good or service, licensing a patent, etc.) as weighted directed vertices (graphically represented as arrows linking the dots). When firm A sells a good or service to firm B, the arrow goes from firm A to firm B. The weight of the vertices represents the unitary cost for purchaser node B of acquiring a good from selling node A⁷⁵. It is graphically represented as the length of the vertex so that the costlier the input is, the longer the vertex is. Following Zhang (2006), this cost includes both monetary and non-monetary costs such as quality and coordination costs. Nevertheless, contrary to Zhang's model, and following the administered prices/normal cost doctrines, monetary costs are not marginal costs but full costs. Firms' vertical positions in the figure represent the tier in which they participate. The lower part of the spectrum corresponds to more upstream activities (for example, the extraction of primary goods) and the upper side of the spectrum corresponds to more downstream activities such as marketing and retail.

Institutional and technical conditionings are represented as a two-dimensional space (i.e. as lines on a plan) on which firms (nodes) are contained. Figure 16 illustrates this.

⁷⁴ For the sake of simplicity and comparability, we assume that all managerial coordination relations are translated in commercial transactions, which is a realistic assumption. For example, if a firm advises another one on the development of a product, it translates into a contract in which a firm sells consulting to the other.

⁷⁵ A second dimension defining the weight graphically represented as the thickness of the vertex could be added to account for the firm's market share. In that way, concentration and economies of scale (a negative relation between a vertex thickness and its length) can be added to our framework. Miberg's (2006) theory of pricing and profits in a global value chains context can be then thought of as a particular case of an extended version of our thesis that includes market shares. This also goes in line with two of the three variables of economic dependence Baudry and Chassagnon (2012) identify within the network-firm: "the concentration of exchanges between member firms" and "the respective sizes of subcontractors". The third one, "the importance of the specific assets engaged in the economic relationship" is implicit in our formulation because the more specific an investment firm A did to work for firm B, the more central firm B will be in respect to firm A. For the sake of simplicity, and in order to highlight what we consider to our main original contribution in this chapter, we have decided not to include market shares and sizes, although they are perfectly compatible with our thesis.

Figure 15: A network-firm with one upstream supplier



In Figure 16, nodes represent firms and the lines that surround them represent the technical and institutional conditionings affecting the network-firm. In this example, the combination of technical and institutional conditionings leaves room for only one firm to exist downstream in the supply chains that can be formed. An example of this can be railway transportation in many European countries, where high fixed costs of having deployed already-existing networks (technical conditioning) and the decision of antitrust agencies to have competition on infrastructure (institutional conditioning) created a monopoly upstream (Cayla, 2014). Technological progress that reduces the high fixed cost of deploying a network or a change in antitrust policy to create competition through infrastructure can be represented by a loosening in the lines that surround the upstream node (firm), opening the possibility to the existence of more firms upstream. Then, changes in any of these two conditionings affect the number of firms in each tier, the scope of their possible vertical integration and the possibility of relating to each other⁷⁶. In terms of Jacobides, Knudsen and Augier (2006), the latter are the “technical” and “legal and regulatory authority” determinants of industry architectures⁷⁷. An industry architecture, in turn, is defined as “a structure of co-specialized agents and assets” that constitutes “a sector-wide construct that defines the terms of the division of labor” (Jacobides et al., 2006, p. 1202). Industrial architectures include full vertical integration, ‘pure’ market relationships between firms and network-firms.

⁷⁶ Let us note that barriers to entry and rent-earning resources can be represented by shaping the contouring lines that would benefit one node over other horizontally competing nodes in, for example, placing it vertically ‘closer’ to suppliers and/or more far away from clients than other competing nodes (i.e. by making it able to charge more and purchase for less than competing firms).

⁷⁷ The authors also consider path-dependency as a third factors that shapes industry architectures.

If a central firm was to leave the network-firm, the value loss for the latter would be greater than if a non-central easy-to-replace firm left (Crook & Combs, 2007). Because “a node [firm] with high betweenness centrality has a great capacity to facilitate or constrain interactions between other nodes [firms] (Freeman, 1979) (Kim, Choi, Yan, & Dooley, 2011, p. 3)”, its removal affects the network more than the removal of a node (firm) with a low betweenness centrality. This means that **central firms are those on which the whole network (-firm) depends more to function because they perform tasks that are more necessary to assure the overall coordination of the network-firm. This is the ultimate reason of its *de facto* power.** This form of market power is vertical in that it is exerted from suppliers to buyers or *viceversa*, and it is ‘fully’ vertical in that it affects the whole network-firm and not only the upstream or downstream tiers directly linked to the firm exerting it. Therefore, we will speak hereafter of “fully vertical market power”.

As network theory shows, a node’s (firm’s) centrality, in turn, is a property of the topology of the network (-firm). If we wanted to establish which node is the most central in a network, there would be many ways to do so. Network theory offers different centrality measures that translate different concepts of centrality. The one that is pertinent to us, as we anticipated a few line ago, is betweenness centrality, which is a measure of the share of total shortest paths in a network that pass through a node (a firm) in a network (-firm). A shortest path is defined as the minimum number of vertices that have to be transited to go from point A to point B. Because in our representation of network-firms all the vertices have to be transited (i.e. all the intra-network-firm transactions have to be done for the final product to be sold), all paths are shortest paths. Then, if we notate a node as N_x where x identifies a particular node in the network, its betweenness centrality can be calculated using Equation 1.

Equation 6: Formula of betweenness centrality of node X

$BC(N_x) = \frac{\text{Number of paths passing through } N_x}{\text{Number of paths in the network}}$

Where BC stands for “betweenness centrality” and N_x for “node X”

In terms of network-firms, since vertices represent a firm buying something to another to continue with the production process of the network-firm, the bigger the share of shortest paths that pass through firm X relative to other firms in the network, the more essential that firm’s contribution to the production of the final product is to the network-firm relative to others. This is the case because each shortest path represents a production process that has been carried on by other firm(s) and requires firm X’s intervention for the final product to be produced. In other words, a firm’s betweenness centrality relative to other firms’ (“relative centrality” hereafter) translates its net

independence within the network-firm. A firm's fully vertical market power within a network-firm is then based on its net independence, which gives it power to distribute the value created by the network-firm in its favor.

Let us illustrate this with an example represented in Figure 17.

Figure 16: Two non-competing network-firms with two tiers and different numbers of upstream suppliers

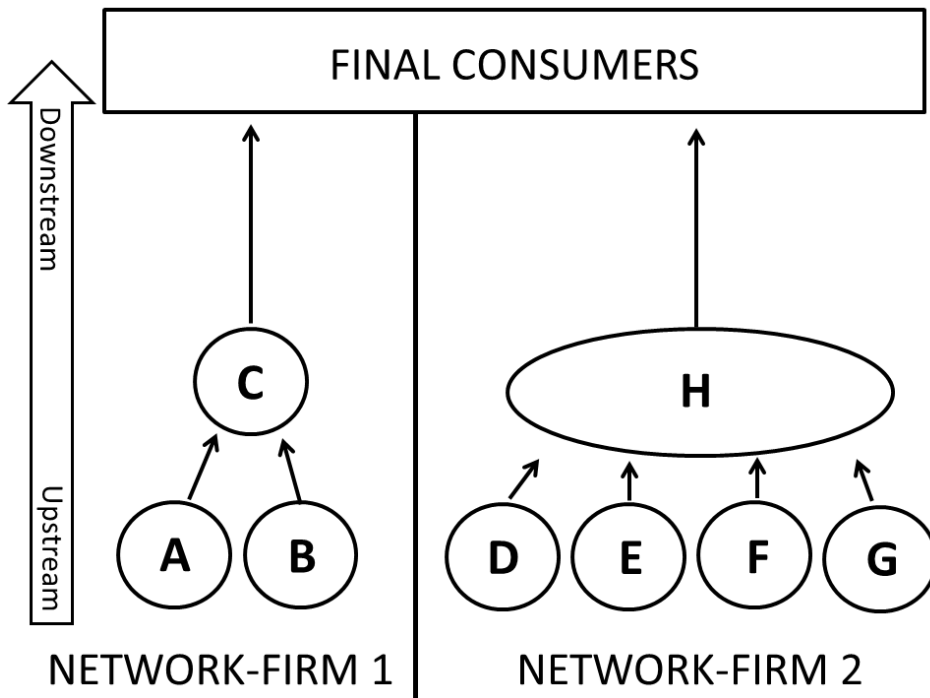


Figure 17 shows two *non-competing* network-firms with two tiers each, one upstream and one downstream. In both, there is a single firm at the downstream level. The line between the two can be interpreted as an institutional and/or technical barrier to entry that makes non-viable for any firm to switch to the other network-firm. For example, the two network-firms could produce the same final good but be located in different continents, with transportation costs and tariffs making it non-profitable to compete with or to switch to the other network-firm. For the sake of simplicity, we will assume that they both sell at the same price per unit, which is 1 even though horizontal price competition is not acting because of the existence of barriers to entry. Graphically, because the lengths of arrows represent absolute per unit prices, this translates into the arrow going towards final consumers having the same length in both network-firms. In Network-Firm 1, there are two upstream firms while in Network-firm 2 there are four. In the first network-firm, there are two shortest paths from upstream suppliers to final consumers, while in the second one there are four.

Using Equations 1 to 4, we can calculate the prices and value retained for each node in a way that is compatible with our thesis according to which the value retained by each node depends positively on its fully vertical market power, which translates numerically into its relative centrality in the network.

Equation 7: Formula of squared betweenness centrality of node X

$$SBC(N_x) = [BC(N_x)]^2$$

Where SBC stands for “squared betweenness centrality”.

Equation 8: Value retained by node X

$$VR(N_x) = \frac{SBC(N_x)}{\sum_{i=1}^n SBC(N_i)}$$

Where VR stands for “value retained” and n is the number of nodes in the network.

There are t tiers in the network. The tier to which a certain node belongs is noted as a superscript of that node, while the subscript of the node, as it was already the case in equations 1, 2 and 3, identifies a specific node. Then, the node x located in tier k would be noted N_x^k . Each tier is noted with a natural number starting from 1, which corresponds to the most upstream tier. The immediately downstream tier is noted 2 and so on until the t^{th} most downstream tier of the network.

Then, given a network with n nodes and t tiers, and assuming that the final selling price is 1, we can calculate the selling price of a node N_x located in tier r *in absence of horizontal competition* with the following formula:

Equation 9: Selling price of node x located in tier r in absence of horizontal competition

$$P(N_x^r) = \left[1 - \sum_i^n \sum_{r+1}^t VR(N_i^r) \right] \frac{SBC(N_x^r)}{\sum_i^n \sum_r^t SBC(N_i^r)}$$

In other words, Equation 4 tells us that in order to calculate the selling price of a node x located in tier r *in absence of horizontal competition* we have to perform the following calculation: one (i.e. the final selling price we set) minus the sum of the value retained by all the nodes located in more downstream tiers (r+1 to t) and divide the result by node x’s share of square betweenness centrality of the sum of the square betweenness centralities of all the nodes located in its same tier (r).

Table 3: Betweenness centrality, price and value retained for firms in two competing supplying chains for Figure 17

FIRM	NETWORK-FIRM	TIER	BETWEENNES S CENTRALITY	SQUARE BETWEENNES S CENTRALITY	PRICE	VALUE RETAINE D
A	1	Upstream	0.5	0.25	0.17	0.17
B	1	Upstream	0.5	0.25	0.17	0.17
C	1	Downstream	1	1	1	0.67
D	2	Upstream	0.25	0.06	0.05	0.05
E	2	Upstream	0.25	0.06	0.05	0.05
F	2	Upstream	0.25	0.06	0.05	0.05
G	2	Upstream	0.25	0.06	0.05	0.05
H	2	Downstream	1	1	1	0.80

Let us show how the application of equations 1 to 4 results in the values shown in Table 2. Since in both network-firms the downstream firms (C and H) are necessary in all the steps of the production process (each of them is the only retailer of its supply chain, for example), their betweenness centrality is 1. On the contrary, suppliers are less central in the second network-firm, where each is needed in one out of four processes (making the betweenness centrality of each of them equal to 0.25), while in the first network-firm each is needed in half of the processes, which is why suppliers A and B have a centrality of 0.5 each. If we used each node's betweenness centrality as a direct measure of their fully vertical market power, we should conclude that since both downstream firms (C and H) have the same betweenness centrality, they should both retain the same share of the value created in their respective network-firms. Since the price of the final product is the same in both network-firms, this would imply firms C and H retaining the same amount of value. Nevertheless, as we said above, a firm's fully vertical market power within its network-firm depends on its net independence (which is translated by its betweenness centrality in the network-firm) *relative to others firms*'. In our example, this means that a firm like firm C that has a betweenness centrality of 1 (i.e. an unavoidable firm in the production process of its network-firm) but deals with two firms that have a centrality of 0.5 each (half of firm C's centrality) has less fully vertical market power than a firm like H that has also a centrality of 1 but deals with four firms that have a betweenness centrality of 0.25 each (a quarter of firm H's centrality). In other words, given that firm H is more central *relative to the other firms in its network-firm* than firm C, firm H has more fully vertical market power than firm C. A way of representing this relationship arithmetically is to pose a positive exponential relation between a firm's betweenness centrality and its fully vertical market power, and then calculating

a firm's retained value as its share of all firms of the network's fully vertical market powers added. This is what we did in Table 2 by calculating the square betweenness centrality of each node. The value retained by a firm, then, equals its share of the sum of the squared betweenness centralities of all the nodes in the network. For example, firm A has a square betweenness centrality of 0.25 (0.5 to the square). The sum of all firms' square centralities in network-firm number 1 is 1.5 (0.25 + 0.25 + 1), which makes firm A's value retained equal to 0.17 (0.25/1.5). Using this formula, we find that although firm H has the same betweenness centrality as firm C, since it has a higher *relative* centrality, its share of value retained (0.8) is higher than C's (0.67).

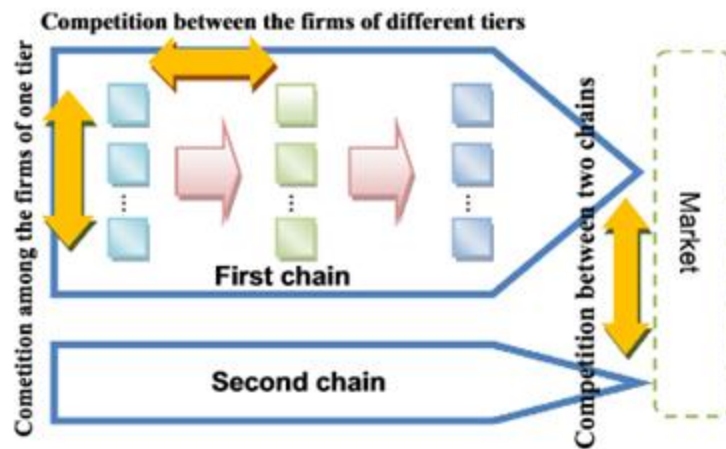
Then, by putting into practice the concept of net independence developed in subsection 3.1.1., the numerical example developed in this subsection shows how the share of the value created by a network-firm that is retained by a particular firm can be calculated as that firm's (node's), relative centrality, a concept that, as shown above, translates the firm's fully vertical market power derived from its net independence. Having shown this, subsection 3.2 will proceed to demonstrating that the resulting uneven distribution of value (profits) can be compatible with strong price competition.

3.2 The compatibility between long-term profit rate differentials and horizontal price competition

We have seen that the fully vertical market power a firm holds within a network-firm is the result of its net independence, which can be arithmetically represented as its betweenness centrality relative to that of the other firms of the network. Fully vertical market power, in turn, is what gives firms the capacity to retain a higher share of the total value produced by the network-firm and, therefore, it can explain long-term profit rate differentials between firms of a same network-firm. **In this subsection, we will show how this fully-vertical-market-power-based explanation of long-term profit rate differentials can be compatible with horizontal price competition.**

There are three competition forces acting simultaneously in a network-firm context (Rezapour, 2012), as described by Farahani et al (Farahani, Rezapour, Drezner, & Fallah, 2014) in their review of the supply chain management literature: competition among the firms of one tier ("traditional horizontal competition", hereafter), competition between two network-firms and competition between the firms of different tiers of the same network-firm. These forces are represented in Figure 18.

Figure 17: The three competition forces in a network-firm context



Source: Farahani et al. (2014)

At this stage of our argumentation, we will only consider horizontal price competition, i.e. competition between firms that sell the same or substitutable good of a similar quality to the lowest possible price (i.e. in a context of strong price competition). Since competences are scattered across firms that are able to produce only certain parts of a final good, horizontal competition takes two forms: traditional horizontal competition (i.e. horizontal competition between firms of the same tier of their respective network-firms) and network-firm vs network-firm (NF vs NF) competition. Consequently, for horizontal price competition between sellers of the final good to take place, only network-firms that minimize the total final price of a good can survive. This important aspect of horizontal competition has been put forward by many scholars coming mainly from the management literature who, attentive to the relevance that global value chains were taking by the mid-1990s, started highlighting the increasing importance of “supply chain vs supply chain” (“network-firm vs network-firm” in our terminology) competition (Andreassen, 2005; Antai, 2011; Christopher, 1999; Langdon & Sikora, 2006; Rice & Hoppe, 2001; Spekman, Kamauff Jr, & Myhr, 1998; Zhang, 2006), although economists have paid little attention to it.

We will define short-run competition by the nature of competition and the factors that firms take as given in the process. The nature of competition is price competition. We assume that firms offer goods of similar quality, leaving competition on quality and innovation for a second stage of long-run competition that we will address in Section 4. The factors taken as given by firms in the short-run are the following:

- Technical and institutional dimensions of competition (as defined above)
- Number of firms in each tier
- Competences of the firms (i.e. what they can produce and with what technology)
- Maximum output of the firms
- Efficiency of the firms (i.e. the minimum possible selling price they can set without making losses)
- Total demand for the final good

Firms can choose three things:

- Production level
- What amount of output/input to sell/buy to/from each downstream/upstream firm
- The selling price

We consider a cost-plus pricing mechanism. More precisely, we consider that firms price in the way described by the administered prices doctrine when they are subject to shareholders' pressure to deliver a certain return on investment. When this is not the case, they price in the way described by the normal cost doctrine (cf. Chapter 2). This means that, in both cases, firms apply a margin rate to normal unitary costs (i.e. calculated for a long-run average rate of capacity utilization), which includes both direct and overhead costs. If the firm has a profit target, the level of the margin (and, therefore, the price) will also depend on it as long as competing firms cannot offer a significantly lower price, as we will show further on. Following this pricing strategy, given a certain demand, firms sell as much as they can. This is certainly an accurate *description* of how firms pricing takes place that is soundly corroborated by empirical evidence (Lavoie, 2014), and we should therefore adopt it when dealing with price competition mechanisms. Nevertheless, it does not say anything about the *determinants* of the level of the margin besides that it depends positively on the target profit rate (if there is one) and on the actual and normal rate of utilization (since the higher the latter is, the lower unitary costs are). Competition forces that set an upper limit to the level of the margin (and, therefore, the price level) must be assumed to affect the level of the margin directly when there is no profit target (mark-up and normal costs doctrines) or to influence the targeted profit rate in the case of the administered prices doctrine. In the case of the mark-up doctrine, Kalecki made this explicit with the concept of "degree of monopoly", which is defined as the share of margin: the less competition there is, the higher the margin can be (Kalecki, 1971; Kalecki, 2013). It is also what postkeynesian theory represents with the expansion of the frontier of the firm (Dallery, 2009). When a firm faces less competition, the frontier is expanded, which means it can obtain a higher profit rate at the same level of growth. We will argue that, in a context of vertical disintegration characterized

by the important role played by network-firms in the global production process, the margin also depends on a form of fully vertical market power that does not consider market power as an obstacle to competition as postkeynesian theory does.

We said above that two horizontal competition forces play in the short run: traditional horizontal price competition and NF vs NF competition. The first thing to notice is that the latter has supremacy over the former. The reason is simple: if a network-firm cannot compete with another one by offering a similar final product of comparable quality at a competitive price, it will eventually disappear. This would imply all the firms constituting the losing network-firm to lose sales linked to that network-firm. Moreover, for traditional horizontal price competition to exist, firms need to integrate a network-firm. Here we can appreciate the role that competition plays as a cooperation-generating mechanism (Turchin, 2015). A network of firms needs to cooperate by coordinating tasks and ‘agreeing’ on value distribution in such a way that they can survive competition from other ‘coalitions of firms’ (i.e. other network-firms). In order to do so, they have to offer a final product of similar quality at a similar price. This suggests that **NF vs NF competition is the competition force that will ultimately determine which network-firms will survive.**

Given the institutional and technical conditions and the other factors taken as given mentioned above, firms must choose to which other firms to sell and from which firms to buy, how much to buy/sell from them and buying and selling price. In other words, firms must cooperate to form competitive network-firms. Since NF vs NF competition has primacy, whatever network-firm emerges from these choices will have to offer a final good at a price that other existing network-firms might match but not beat in the short-run. In parallel, traditional horizontal price competition assures that prices between firms that can produce the same good are similar. Finally, for the sake of simplicity, we assume that all the units produced by the network-firms are bought by final consumers.

As the transportation problem solution to supply-chain formation in the management literature shows (Nagurney, 2006; Nagurney, Liu, & Woolley, 2007; Zhang, 2006; Zhang, Dong, & Nagurney, 2003), the network-firms that will be formed are those that can survive NF vs NF competition, i.e. those for which the length of the last vertex or the sum of the lengths of the vertices at the most downstream level (the final total cost per unit of the final good) is the lowest possible. Moreover, as said before, at every tier of network-firms, traditional horizontal price competition makes firms sell similar goods at the same or similar prices. Finally, we have seen that fully vertical market power, which translates in a firm’s ‘betweenness centrality relative to others’, is what determines its capacity to capture a share of the value produced within the network-firm through pricing. Using some examples, we will show in the following

lines how these three forces that affect pricing in a network-firm context (NF vs NF competition, traditional horizontal price competition and fully vertical market power) are compatible. Our first example is represented in Figure 19.

Figure 18: Two competing network-firms with two tiers and identical topologies

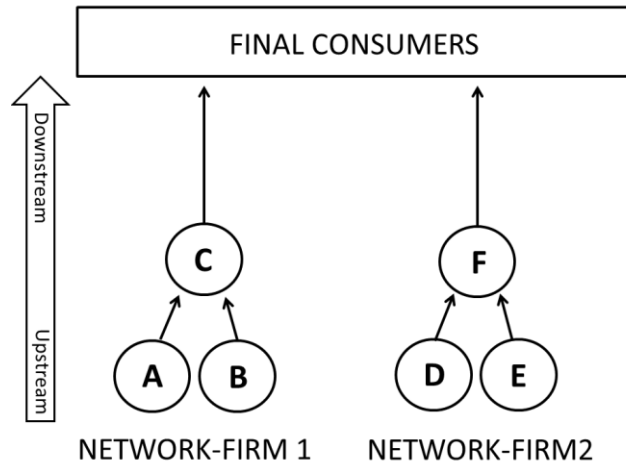


Figure 19 shows two network-firms that have the same topology as network-firm 1 in the previous example: one downstream retailer and two upstream suppliers. For the sake of simplicity, we will assume that firms' only cost is buying inputs from other firms in the network-firm and that firms at the most upstream level (A, B, D and E) produce without buying inputs. Then, a firm's value retained is by definition equal to the difference between the sum of the prices to which it sells to more downstream firms/final consumers minus the sum of the price to which they buy from more upstream firms. Because NF vs NF competition is acting, the price to the final consumer has to be the same in both network-firms. In our example, this price is 1. Moreover, since traditional horizontal price competition is acting, prices at each tier also have to be the same.

When we calculate betweenness centralities, square betweenness centralities, prices and value retained for each node using Equations 1 to 4, according to which prices and value retained are determined by firms' relative centralities, we obtain the values presented in Table 3.

Table 4: Betweenness centrality, price and value retained for firms in the two competing network-firms represented in Figure 19

FIRM	NETWORK-FIRM	TIER	BETWEENNESS CENTRALITY	SQUARE BETWEENNESS CENTRALITY	PRICE	VALUE RETAINED
A	1	Upstream	0.5	0.25	0.17	0.17
B	1	Upstream	0.5	0.25	0.17	0.17
C	1	Downstream	1	1	1	0.67
D	2	Upstream	0.5	0.25	0.17	0.17
E	2	Upstream	0.5	0.25	0.17	0.17
F	2	Upstream	1	1.00	1	0.67

As it can be noticed, the prices that we calculated for each tier using Equation 4 and the price of the final output of these two network-firms are the same, which is why the arrows for each tier have the same length. This shows that price competition is acting. At the same time, the distribution of value within the two network-firms, which we calculated using Equation 3, is uneven and responds to firms' fully vertical market power. Moreover, the value retained by each firm, which we calculated using Equation 3, respects the logical constraint of being equal to the difference between the sum of the prices to which the firm sells to more downstream firms/final consumers minus the sum of the price to which it buys from more upstream firms.

In other words, both traditional horizontal price competition and NF vs NF competition are acting without any obstacle to competition (concentration, product differentiation or rent-earning resources) being in place. Moreover, these 'free competition' prices are compatible with the unequal value capture (which in our example equals the profit rate⁷⁸) that results from each firm's net independence within its network-firm relative to others'. The firms that are less benefited by this distribution of value (suppliers A, B, D and E) can freely choose to switch to the other network-firm. However, the fact that they only have supplier capabilities compels them to join network-firms as suppliers, which subjects them to the forces of fully vertical market power in the network-firm they choose to join.

Let us now present another example in the same line but in which competing network-firms' topologies differ. This example is slightly more complex than the previous one, but it will allow us to see the cascade effects of NF vs NF competition between tiers. The same assumptions made in the previous example hold for this one.

⁷⁸ If fixed costs were introduced, we could calculate the profit rate.

Figure 19: Two competing network-firms with three tiers and different topologies

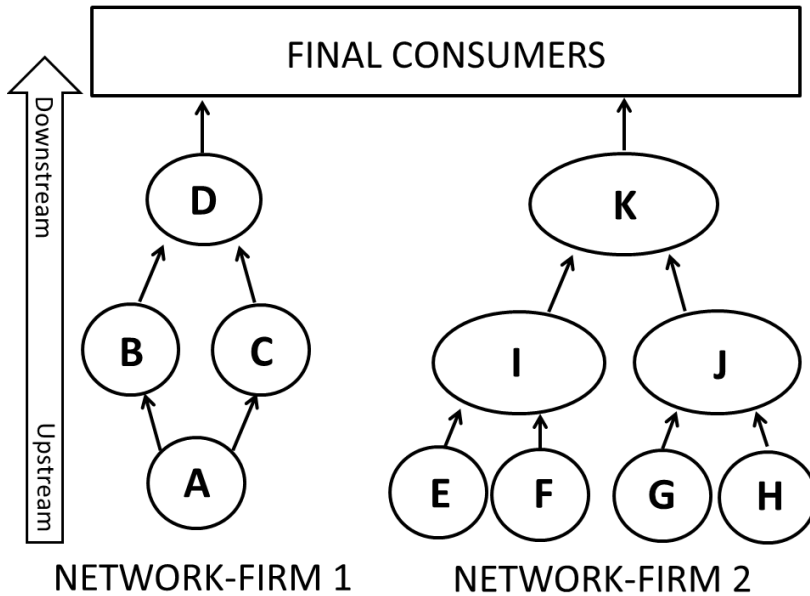


Figure 20 depicts two competing network-firms with three tiers each. The difference between the two is that while in the first one there is a single supplier in the first tier (firm A), in the second one, each firm from tier number 2 buys from two suppliers from tier number 1, so that there are four suppliers in tier 1 overall. If we calculate betweenness centralities, square betweenness centralities, the value retained and the selling price for each firm in these two network-firms in the same manner we did it in the previous examples (i.e. using Equations 1, 2, 3 and 4, respectively) we obtain the values for $t=0$ presented in Table 4.

Table 5: Betweenness centrality, prices in t_0 and t_1 and value retained for firms in two competing supplying chains represented in Figure 20

FIRM	NETWORK FIRM	TIER	BETWEENNESS CENTRALITY	SQUARE BETWEENNESS CENTRALITY	PRICE ($t=0$)	VALUE RETAINED ($t=0$)	PRICE ($t=1$)	VALUE RETAINED ($t=1$)
A	1	1	1	1	0.20	0.40	0.07	0.14
B	1	2	0.5	0.25	0.30	0.10	0.21	0.14
C	1	2	0.5	0.25	0.30	0.10	0.21	0.14
D	1	3	1	1	1.00	0.40	1.00	0.57
E	2	1	0.25	0.06	0.04	0.04	0.04	0.04
F	2	1	0.25	0.06	0.04	0.04	0.04	0.04
G	2	1	0.25	0.06	0.04	0.04	0.04	0.04
H	2	1	0.25	0.06	0.04	0.04	0.04	0.04
I	2	2	0.5	0.25	0.21	0.14	0.21	0.14
J	2	2	0.5	0.25	0.21	0.14	0.21	0.14
K	2	3	1	1	1.00	0.57	1.00	0.57

The first thing we can notice is that, while firms from tiers 2 and 3 have the same level of betweenness centrality in both network-firms, firm A in network-firm 1, which monopolizes upstream production, has logically a higher betweenness centrality than each individual firm in tier 1 of network-firm 2. Nevertheless, this does not translate in firms from tiers 2 and 3 of both network-firms having the same fully vertical market power respectively. Keeping in mind that fully vertical market power depends on a firm's betweenness centrality *relative to others*', we have that firms from tiers 2 and 3 in network-firm 2 can retain more value than their counterparts in network-firm 1 in t_0 . The reason is that in network-firm 1 there is a firm with a high betweenness centrality (A, with a betweenness centrality of 1) in a tier where in network-firm 2 there are four firms with small betweenness centralities (0.25 each). As a result, other firms' betweenness centralities in network-firm 2 are larger relative to those of the firms of its network-firm compared to network-firm 1. Then, not only do firms that bypass the monopolist supplier by recurring to two suppliers each (firms I and J) have a larger fully vertical market power than their counterparts of network-firm 1 (firms B and C), but the firm that buys from them, firm K, also has more fully vertical market power than its counterpart firm in the competing network-firm (firm D), because this 'bypass' makes it more central relative to other firms within its network-firm.

However, fully vertical market power is altered by horizontal competition forces. If we calculate the prices that each firm in network-firm 1 would have to charge to obtain a final price of 1 (i.e. for NF vs NF competition to hold) and for value distribution to depend on each firm's squared betweenness centrality (if we use Equation 3 to calculate prices given that the final price is 1), we would find, as we can appreciate by looking at the column corresponding to prices in t_0 , that prices of the same product in the

two competing network-firms would differ. In other words, traditional horizontal price competition would not be acting. Let us see what happens if we consider both NF vs NF and traditional horizontal price competition to be acting, which translates into each tier having the same overall price. Then, when horizontal competition is introduced, prices and value retained are calculated in using Procedure 1.

Procedure 1: How to calculate the selling price and the value retained corresponding to a node in presence of horizontal competition

Step 1: Calculate betweenness centralities, square betweenness centralities, value retained and prices of all nodes for all competing network-firms using Equations 1 to 4.

Step 2: For each node, check if the selling price calculated using Equation 4 is higher than any of the selling prices of the competing node(s) of the same tier in competing network-firms.

If it is not the case, retain Equation 4 to calculate the selling price of the node in question.

If it is the case, adopt the price of lowest competing node(s) of the same tier of competing network-firms. Then, the selling price becomes an exogenous variable for the node in question and the value retained will be endogenously determined using Equation 5.

Equation 10: Value retained by a node x located in tier r when it has to match lower prices from competing nodes of its same tier

$$VR(N_x^r) = \sum P(N_x^r) - \sum C(N_x^r)$$

Where C stands for the cost paid by node N_x^r , which is equal to all the purchases made from nodes located in immediately more upstream tiers of the network-firm.

The prices and values retained for each firm using Procedure 1 are shown in the columns corresponding to t_1 in Table 4. Because horizontal price competition is acting, supplier A in network-firm 1 has to match the price of the competing network-firm 2 suppliers that provide the same input (i.e. the sum of two of the first tier suppliers' prices). The same happens in the second tier. In Network-Firm 1, firms B and C are forced to match firms I and J's prices, which are lower because the latter are more relatively central in their network than firms B and C. Nevertheless, because horizontal price competition in the most upstream tier makes firms B and C buy inputs from firm A at lower prices, their value capture increases from 0.1 to 0.14.

The takeaway from this example is that firms have to adapt to the prices set by the network-firms with topologies where the distribution of centralities (and, therefore, the distribution of the value created by the network-firm) is more uneven. Eventually, as a result of both traditional horizontal price competition and NF vs NF competition forces, we should expect competing network-firms to converge to the topology of the one that sets the lowest prices. This seems to be the case, as the literature on global value chains and the network-firm show. In these two strands of literature we find several broad categorizations of network-firms' topologies that are identified with certain industries. These two literatures converge in identifying three broad topologies that correspond to three "governance structures"⁷⁹: modular/contract manufacturing, relational/collaborative manufacturing and captive/arm's length (Herrigel & Wittke, 2004; Kaplinsky, 2013; Sturgeon, 2008; Weinstein, 2011). Moreover, the global value chains literature that has developed more detailed case studies also finds similar or "generic" network-firms' topologies in the same industries. For example, Herrigel and Wittke (2004) show along other scholars that "the quintessential realm for contract manufacture in the contemporary manufacturing environment is product level electronics" (Lüthje, 2002; Lüthje, Schumm, & Sproll, 2002; Sturgeon, 2002). On the other hand, the literature on the network-firm has also identified other country-specific network-firm topologies such as the "Japanese model", the "Italian model" or the "German model" (Sturgeon, 2002). Both the network-firm and the global value chains literatures discuss the conditions required for the network-firm in general and each topology of the network-firm in particular to emerge. *In fine*, we conclude with Powell that "network forms have multiple causes and varied historical trajectories" (Powell, 2003). Regardless of the multiplicity of factors that influence the emergence or a particular network-firm topology, the important takeaway is that both the GVC and the network-firm literatures agree on the fact that these topologies are shared by competing network-firms. Therefore, we can see a convergence of competing network-firms towards similar topologies, as our previous example suggested it should happen. **This convergence is both the result of similar institutional and technical conditionings applying to competing network-firms (similar regulations, state of the art technology requiring a certain pattern of combination of competences held by different firms, etc.) and the effect of NF vs NF and traditional horizontal price competition forces that create a pressure for network-firms to adopt the topology of the network-firm where the final value of the product is the lowest (NF vs NF competition) and value distribution is more unequal, as shown in the last example.** This reinforces our main point. **Given that competing network-firms have similar topologies, and even in an environment in which traditional horizontal price competition and NF vs NF competition forces are strong, value distribution (and, ultimately, profit rates) within the**

⁷⁹ We exclude the "market" and "hierarchy" governance structures since they are not network-firm or global value chains topologies.

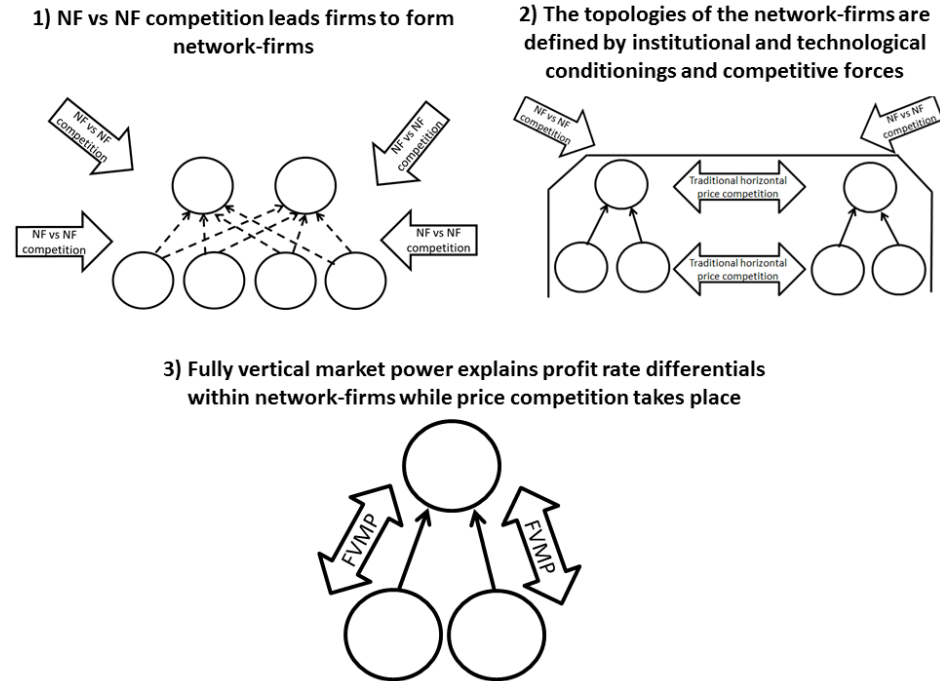
network-firm depends on firms' net independence, which translates into firms' betweenness centrality relative to others'. This allows for horizontal competition to act 'freely' and, at the same time, profit rates being unequal in the long-run across industries (tiers of a network-firm).

Indeed, in the second example all firms are assumed to be equally efficient. Their only cost is the inputs they purchase to upstream firms and their only revenue is the price they charge to downstream firms. Since horizontal price competition is acting, prices for the same good in competing network-firms equalize, which makes firms from competing tiers (i.e. industries) have the same profit margin⁸⁰. Given that we assumed that there are no fixed costs, the profit margin equals the profit rate. **Nevertheless, even if firms can freely enter or exit markets without any sort of barriers to entry or to exit applying, profit rates between tiers (between industries) do not equalize because of the fully vertical market power that arises from an uneven distribution of interdependences within network-firms. The restated market power paradox we proposed in Chapter II makes full sense now: competitive behavior results in the obtaining and the exertion of market power by some firms, which renders the competitive landscape... *competitive*.** The fully vertical market power mechanism that acts in the financialized form of competition, in which the network-firm is the norm, is therefore not the opposite of competition. **Competition and fully vertical market power are not two opposed concepts but two manifestations of the same competitive process. Fully vertical market power glues the network-firm together, making NF vs NF competition possible. Moreover, as we will show in the next section, competition in the long-run takes the form of competition *for* fully vertical market power. This does not mean that barriers to entry or obstacles to competition in general do not exist in network-firms, but rather that profit rate differentials between tiers of a network-firm (industries) can be explained as the result of fully vertical market power without that meaning that price competition is necessarily lessened.**

Diagram 6 represents a summary of our concept of short-run competition and fully vertical market power between and within network-firms we have developed theoretically in subsection 3.1.1 and illustrated with numerical examples in subsections 3.1.2 and 3.2.

⁸⁰ We could complexify the example by adding fixed costs and different efficiencies between competing firms of the same tier in order to obtain differential profit rates between them (i.e. within an industry). We would still find that profit rates between firms of different tiers would not equalize.

Diagram 6: Summary of our concept of short-run competition and market power within and between network-firms



It can be summed up in three logical steps.

1) As described in the last section of Chapter I, the current form of competition is characterized by vertical disintegration and firms' withdrawal to their core competences. This implies that, in order for a final product to be produced at the lowest possible price, firms need to form coalitions of network-firms in which each firm will bring its core competences in order for the network-firm to produce the final product at the lowest possible final price. In other words, because firms are not able to produce a final product by themselves at a competitive price, network-firm vs network-firm competition forces them to integrate a network-firm that will be more competitive than a vertically integrated firm would be.

2) The topology of the network-firm depends on several factors.

First, we have institutional and technological conditionings. For example, in railway transportation in many European countries, high fixed costs of having deployed already-existing networks (technical conditioning) and the decision of antitrust agencies to have competition on infrastructure (institutional conditioning) created a monopoly upstream (Cayla, 2014), which means that in the network representing the railway network-firm there will be only one node (firm) at the most upstream tier .

Second, given the institutional and technological conditionings, we have competitive forces. On the one hand, we have network-firm vs network-firm competition, which forces network-firms to sell the final product at a similar price regardless of how the repartition of value within the network-firm is done. On the other hand, we have traditional horizontal competition, which forces firms of the same tier belonging to competing network-firms to sell at a similar price to the firm located downstream of its network-firm. As we have shown along this chapter, because firms with higher relative centralities in their network (i.e. firms that are more essential to the production process of their network-firms) can retain more value by buying from their suppliers in the network-firm at a lower cost, they can be more competitive in terms of price. Then, traditional horizontal competition obliges less relatively central firms of the same tier located in competing network-firms to match their prices and, consequently, to suffer a reduction in the share of value they retain. This process eventually leads to less competitive (less relatively central) firms being replaced by more competitive (more relatively central) firms, and, therefore, the topologies of competing network-firms tend to converge to that of the network-firm where relative centralities are more unequal.

3) Then, once a standard topology is attained by the competing network-firms, we have that the lowest price has been adopted at all tiers of the network-firm (i.e. **traditional horizontal price competition and network-firm vs network-firm price competition are both acting**) and that, at the same time, those prices are compatible with an uneven distribution of value (of profit rates since there are no fixed costs in our example) within the network-firm. Moreover, the value retained by each firm is directly linked to its fully vertical market power (i.e. to its net independence or to how essential the firm is in the overall production process of its network-firm), which translates into the firm's relative centrality in the network.

We can therefore say that the goal of this chapter has been met: both price competition and long-run profit rate differentials are compatible in our concepts of competition and market power between and within network-firms.

Let us close this section by pointing out that the concepts we have developed in this chapter show that **in the current Finance-led form of competition, similarly to what had happened during the collusive form of competition in the United States (1870s to 1910s) analyzed in Chapter I, a symbiotic relation between market power and competition takes place. Indeed, we have shown that, in the short-run, market power coordinates competition, as it is what glues together a set of firms within a network-firm and allows the lead firm(s) to coordinate the production process of the network-firm for the whole network-firm to be able to compete on prices with other network-firms** Then, market

power, in the form of fully vertical market power within a network-firm, allows for the fulfillment of competition. Moreover, it is precisely the existence of strong price competition what forces firms to form network firms of which fully vertical market power is constitutive to survive it. Then, competitive forces produce a form of market power (fully vertical market power) that do not hinder them. We can therefore speak of two-way symbiotic relation between competition and market power.

Moreover, the symbiosis between competition and market power proper to the Finance-led form of competition (1980s to present) identified in Chapter I and that we have developed in this chapter not only differs from that of the collusive form of competition in its mechanisms and in that the latter proved to be weak, as collusion and, later on, horizontal integration, were unable to compensate for the survival-threatening damage predatory competition was doing to firms' profitabilities. **The symbiosis between competition and market power proper to the Finance-led form of competition is also particular in that it is the translation in the realm of industrial organization of the financialization process evoked in Section 5 of Chapter I, which resulted in historically unusual levels of return on investment (usually not below 15%) going to the financial sector (Auvray, Dallery, & Rigot, 2016). One of the mechanisms that allowed for such historically high returns on investment has been the reconfiguration of the link between competition and market power in the context of global value chains, which allowed some firms to obtain high profits to the detriment of other firms of their global value chains (internationally-dispersed network firms) in order to satisfy the financial sector's draconian demands of return on investment the internationalization and liberalization of finance (and the consequent liquefaction of capital) that started in the 1980s enabled. In terms of the governance of the firm, as said in Chapter I, this translated into the supremacy of the "shareholder governance" model (Caby & Hirigoyen, 2001).**

4 Long-run competition for fully vertical market power

“Los abogados y los innovadores eran predadores que competían entre sí por la transformación del territorio, y el ciclo biológico de la tecnología pedía otro tipo de ecosistema”⁸¹.

Pola Oloixarac, *Las constelaciones oscuras*, p. 162

We have so far dealt with a situation in which everything was constant except for prices and production levels. We have seen that, given a certain network-firm topology, firms have fully vertical market power that derives from the position they occupy within the network-firm, which is the translation of their net independence. This power allows them to influence buying/selling prices in their favor. It is expectable then that, given that firms' competences and institutional and technological contexts evolve over time, firms try to evolve along in order to occupy the positions in network-firms that will give them a higher fully vertical market power; or to redefine the topology of the network so they will become more central in it and, therefore, increase their fully vertical market power. Then, in the long-run, we can expect competition *for* fully vertical market power. This is what we actually observe. **In this section we will briefly show how firms' choices regarding innovation, make-or-buy decisions and influencing institutions that define markets and competition (property rights, technological standards, regulation in the broad sense) can be read as a strategy by firms to obtain a higher relative centrality (fully vertical market power) within their network-firms.**

Firms can modify their net independence or relative centrality within a network-firm either by changing positions within the same network-firm or by modifying its topology. Regardless of the method chosen, there are two ways in which this can be accomplished. The first one implies a modification in their competences and/or changes in technology in order to obtain a more central position in their network-firm relative to other firms' (Subsection 4.1). The second one implies a change in the institutions that has the same purpose (Subsection 4.2). We are therefore both in a long-run and a topological perspective, since firms intend to modify the topology of the network-firm and to occupy the more central positions it offers by affecting long-run variables: technology, competences and institutions.

⁸¹ The quote translates as “lawyers and innovators were predators competing with each other over the transformation of the territory, and the biological cycle of technology asked for another type of ecosystem”.

4.1 "Make-or-buy" and innovation decisions as long-run competition for fully vertical market power

The first mechanism through which firms can obtain a more central position in the network-firms they participate of is make-or-buy decisions. Weinstein refers to it in respect to the problem of strategic assets when he writes that “in any case, a firm’s organizational choices and overall in-house/outsourcing choices are strongly oriented by power and ‘value chain’ control issues, to the same extent if not more than by static or dynamic efficiency criteria. The major problem is then to identify the strategic assets (material and immaterial) that allow that result and the conditions of their control through property or by other means” (Weinstein, 2010)⁸². In the context of our framework, this means that firms can decide to outsource or keep in-house a task in order to become more central in their network-firms. In a network-firm, the hub-firm, “which is the firm that, in fact, sets up the network and takes a proactive attitude in the care of it” (Jarillo, 1988, p. 32) is the one that can capture a higher value share in the network. This “central power” in the network “is legitimated by its key strategic role in the coordination of the whole network. The degree of coordination of the network is high because of the large number of relational contracts. This coordinator role confers the hub-firm a durable specific resource and so a reproducible source of power” (Chassagnon, 2009, p. 25). In other words, the hub-firm’s market power comes from its ability to “manage diverse and complementary capabilities” (Chassagnon, 2011, p. 10). Moreover, “such an assignment must belong to the hub-firm that controls critical resources as brand name and reputation around which revolve complementary activities that need to be qualitatively and quantitatively coordinated” (Chassagnon, 2011, p. 10). The extreme case is the hollow corporation (Coriat & Weinstein, 2015), which is “a business entity that does not have any core technical competences and uses contractual mechanisms to link particular market requirements with productive capacities” (Tece et al., 1994, p. 20).

Being the coordinator of the network implies, in our framework, a high net independence, which translates into a high relative centrality. Visually, this would translate into many arrows indicating productive processes that require the contribution of the hub-firm. Our theoretical contribution allows to understand in a more precise and general way why some resources are critical and make it possible for hub-firms to dominate their supply networks and, consequently, to extract more value from it than other participating firms. **Critical resources (either material or immaterial) are those whose private and exclusive ownership by the hub-firm allows it to make other firms in the network-firm that have complementary competences more dependent on the hub-firm than the hub-firm is on them. This**

⁸² The translation is ours

happens because the critical resource is complementary to the competences of other firms in the network-firm and necessary in order to produce in a way efficient enough to resist NF vs NF competition.

These considerations have important implications for the understanding of the evolution of firms' competences and their boundaries. We will argue that the maximizing-net-independence logic behind make-or-buy decisions applies not only to firms' decision on what already existent competences to keep in-house and which ones to outsource; it extends to what new competences to explore. In other words, it applies to organizational and technological innovation paths.

Nevertheless, firms cannot acquire any competence at any given time to maximize their net independence. Evolutionary theory shows that a firm's change in terms of competences follows a coherent and path-dependent evolution that exploits asset complementarities and is influenced also by other "environmental" factors such as technological opportunities, the convergence of technological paths and selection mechanisms (i.e. competition mechanisms) (Teece et al., 1994). We argue along with evolutionary theory that firms evolve in their competences in a coherent way, which means that "firms over time add activities that relate to some aspect of existing activities. They build literally on what they have got. New product lines bear certain technological and market similarities with the old" (Teece et al., 1994, p. 3). This is the case because, as the evolutionary theory of the firm argues, firms are characterized by a unique repertoire of routines, which are problem-solving devices (Dosi, 2012) the firm possess and allow it to coordinate and treat knowledge. Firms evolve in their competences by recurring to learning processes through which they discover what the best routines are to solve the problems they want to solve (Teece et al., 1994). Moreover, learning is "a process of trial, feedback and evaluation" that makes new competences to be "close in" to previous activities. In other words, "a firm's previous investments and its repertoire of routines (its 'history') constrains its future behavior" (Teece et al., 1994, p. 17). Finally, firms tend to evolve technologically by trying to exploit complementary assets⁸³. In that manner, they intend to increase their utilization rate to deal with sunk costs. The choice of complementary assets responds to the fact that "the cognitive path associated with doing this is likely to be clearer than other alternatives" (Teece et al., 1994, p. 21).

We argue that in the context of global value chains, firms not only evolve in their competences in a coherent and path-dependent way that exploits assets' complementarities; they do it also seeking to maximize their net independence or relative centrality in the topology of the network-firms they

⁸³ The exemption being fusions and acquisitions that can be motivated by a firm's (or two firms') desire to acquire competences it/they do/does not have that are situated far from its/their traditional domain of knowhow.

participate of. Firms seek to develop the competences that will allow them to make other firms in the network-firm more dependent on them than they are on other firms. In other words, because the current selection environment or form of competition rewards central firms, firms will seek to, as far as possible, evolve in their capabilities in such a way that maximizes their relative centralities. This implies that firms choose their current and future boundaries betting on the competences that will allow them to maximize their relative centrality or net independence. Firms' evolution is therefore not only coherent and path-dependent, but also strategic. Let us develop on this and provide some examples in the following lines.

This rationale of innovation proper to the Finance-led form of competition form echoes a similar movement that, as shown in Chapter I, had occurred *within* the Taylorist firm at the beginning of the XXth century. Taylorism had taken away from workers the monopoly of the knowhow of the production process. This had allowed firm owners to set the conditions of the production process and, as a consequence, to extract more surplus value from workers (Coriat, 1979). More than 50 years later, a similar movement occurred *between* firms. **Firms that acquired the indispensable core competences needed to produce a final product can set production conditions to other firms of the network-firm and, therefore, extract more surplus value from them. Identifying this mechanism opens the door to a reinterpretation of the vertical disintegration process that started with the crisis of Fordism in the 1970s as a reconfiguration of the form of competition that allowed for the recovering of the profit rate... of some firms.**

Let us now develop on the concrete ways in which firms can increase their net independence/relative centrality in the network-firm by innovating (i.e. obtaining new organizational and/or technological competences). It can occur in two potentially overlapping ways. **The first one is obtaining new competences that allow a firm to replace another one in the network-firm but with the latter's topology remaining unchanged.** This is what the literature on global value chains usually refers to as “functional upgrading” (Gereffi & Lee, 2016; Kaplinsky & Morris, 2001; Schmitz & Humphrey, 2000). When firms upgrade to positions of the value chain that imply different competences and a higher value capture, they upgrade from a less central position in the network-firm to a more central one, which explains why they can capture more of the value created within it, as we explained above. The multiple case studies conducted within the global value chain framework show that firms follow a path in their innovation processes that aims at acquiring other (more relatively central, we add) firm's capabilities in the value chain.

The second way for firms to obtain a more central position in the network-firm by recurring to new competences is to modify the topology of the network-firm. Firms can acquire new technical and/or organizational competences that make a reconfiguration of the network-firm around it more efficient for the network-firm as a whole. Therefore, NF vs NF competition forces will make that new configuration survive over the previous one. Other firms will then have to accept a new network-firm topology in which the firm that has successfully innovated becomes more central and, therefore, gets a higher share of the value produced by the network-firm. The result of this type of strategic innovation is therefore a new network topology that enlarges the share of value capture by the innovator (Santos & Eisenhardt, 2004), as Morris and Ferguson (1993) have shown for technological architectures and Gawer and Cusumano (2002) for platforms. Jacobides, Knudsen and Augier arrive to the same conclusion when they write that “an industry architecture⁸⁴ will emerge on the basis of the interfaces defined by firms that initially happen to hold superior capabilities, in terms of technical efficiency (Jacobides & Winter, 2005)” (Jacobides et al., 2006, p. 1203). An example of this dynamics is Monsanto, which developed genetically modified seeds that allowed farmers to benefit from productivity increases. Since the latter need to resist horizontal price competition and the whole network-firm needs to resist NF vs NF competition, these seeds were adopted, reconfiguring network-firms’ topologies in such a way that Monsanto became the upstream supplier. Given that Monsanto is the sole owner of the seed, it can charge high prices and impose harsh conditions on the means of contract law (Kloppenborg, 2014). Because NF vs NF and traditional price competition forces are acting, farmers are forced to adopt the use of the seeds and to pass contracts with Monsanto that do not favor them.

In the case of technological innovation, technological discovery does not have necessarily to come from the firm that becomes more central. Firms can exploit a newly available technology to create new value chains or modify existing ones in a way that makes them more central in it. Let us note that whereas technological change comes from the firm that obtains a higher relative centrality or not, it implies a change in the technical conditionings of network-firms, which graphically translates in a change in the shape of the contouring lines that surround nodes (firms). Logically, the new contouring lines foster an increase in the innovating firms’ relative centrality.

4.2 Institutional change as long-run competition for fully vertical market power

Lead firms governing a network-firm can influence institutional change so that the topology of the network-firm is modified in a way that makes them more central. In other words, they can “orient the

⁸⁴ As mentioned above, the network-firm is a subset of industry architectures.

functioning of the market (and stabilize rules) in a way that favors the formation of unequal surplus sharing or rents attached to exchanged products” (Coriat & Weinstein, 2005, p. 3)⁸⁵. It can relate to changes in regulation in the broadest sense, property rights reconfiguration, technical standards setting, etc. Markets are institutions that, among other things, define and condition the rivalrous interactions between firms in the competitive process. It follows from this observation that “the rivalry can be exercised as an attempt not only to directly surpass the other sellers or buyers but also to control and modify the institutional environment for the seller’s or buyer’s own benefit” (Fernández-Huerga, 2013, p. 116). This phenomenon has been studied in the literature and covers a wide range of heterogeneous industries such as healthcare (Scott, 2000) smart cards (M’Chirgui, 2006), nanotechnology (Grodal, 2006) mobile telephony (Leiponen, 2006), construction (Cacciatori & Jacobides, 2005) or even two-sided markets in general (Eisenmann, Parker, & Van Alstyne, 2006).

The clearest manifestation of this form that long-run fully vertical competition mechanisms can take is lobbying. Firms invest financial resources to influence institutions in their favor. In some cases, this is done to maintain or expand their relative centrality in network-firms. For example, they can lobby to set technological standards that require the use of their intellectual property, assuring so that other firms in the network-firm will have to use its technology, which increases its relative centrality. A recent example of this is the “regulatory competition” between teams of firms and States in the setting of digital broadcasting standards. The United States, Japan and Europe competed through lobbying in order to impose the standards of their national champions “in order to attract or retain businesses and investment within their jurisdiction” (García Leiva, 2011, p. 104). From a network-firm perspective, this can be seen as a competition between downstream firms (broadcasters) trying to modify regulation (an institutional conditioning) so that more firms will depend on them to deliver the final product (so that their net centrality will increase).

The most important institutional change that has been altering network-firms’ topologies in a way that makes them more asymmetrical in terms of the relative centralities of firms is certainly the extension and increasing enforcement of property rights. As we have seen in Chapter I, since the late 1970s, the domain of what might fall into private and exclusive property has been extending considerably, notably in the realm of immaterial assets through intellectual property rights (Orsi & Coriat, 2006). In parallel, its enforcement has been increasing as well, especially after the signature of the TRIPs agreement (Grosheide, 2010). This process of extension of intellectual property rights and their enforcement has allowed firms to have exclusive control of some immaterial assets (patents, trademarks, databases, etc.) that used not to be subject to ownership such as living entities (Tordjman, 2008) or

⁸⁵ The translation is ours.

software (Mangolte, 2013). In the case of copyright, its extension in terms of duration and its increasing enforcement has played the same role in creative industries (Bell, 2000). Since these immaterial assets are required by all the firms in their value chains to produce, firms that control them have been benefiting from a high net independence in their network-firms, which has allowed them to extract more value and to set conditions to other participants of the network-firm. A good example of this is the Ipod. Apple's ownership of some key intellectual property assets (both patents and the brand) gives it a central position in the Ipod supply chain and, as a consequence, Apple captures roughly 28% of total retail price, which is considerably more than what other firms of the supply chain capture (Linden, Kraemer, & Dedrick, 2009).

Conclusions

The goal of this chapter was to set the basis of a theory of competition and market power that would be able to make two major empirical facts of the current Finance-led form of competition described in Chapter I compatible: high competitive pressure on prices and long-run profit rate differentials between firms of different industries (tiers). In **Chapter I** we had seen that the most relevant form of organization of production in the current Finance-led form of competition is the global value chain and that the process of financialization allowed the financial sector to demand historically high rates of return. In **Chapter II** we have shown that no competition theory is capable of making strong price competition and long-run profit rate differentials between firms of different industries compatible, and we have suggested that a competition theory that expected to meet those expectations would have to have a fully vertical scope. In other words, a competition theory of the global value chain was needed.

In **Section 1** of this chapter, we showed that the global value chains literature has gone through four phases in the way it has evolved regarding competitive dynamics and explanations of profit rate differentials between tiers, but none can offer the theoretical conciliation we were looking for. Just like most of the competition theories examined in Chapter II from which this eclectic literature takes elements from, the global value chains literature recurs to mechanisms identified in that chapter in which market power is conceived as an obstacle to competition (rent-earning resources, product differentiation and concentration) to account for profit rate differentials between firms. This makes the conciliation of long-run profit rate differentials between firms and strong price competition impossible. The examination of the global chains literature done in Section 1 therefore confirmed the idea that we would need to develop a theory of competition and market power in global value chains in order to bring about that conciliation.

Consequently, the rest of this chapter was devoted to developing a contribution to a theory of competition and market power within and between global value chains that would make strong price competition and long-run profit rate differential between firms compatible. In order to do so, in **Section 2** we started by developing a theory of the network-firm, global value chains being internationally-dispersed network-firms. Our analysis placed power relationships originated in interdependence between firms at the center of the definition and the boundaries of the network-firm. In our conception, in the network-firm, a particular relation between competition and market power that in Chapter I we had also identified in the collusive competition era (1870s to 1910s), although acting through different mechanisms, takes place: market power does not hinder competition but *coordinates* it.

The contributions to competition and market power theory presented in **Section 3** considers two horizontal competition forces, namely traditional horizontal price competition and NF vs NF price competition. These two forces assure high competitive pressure on prices at each tier. **We have shown that, in the absence of any kind of market power as an obstacle to competition (rent-earning resources, product differentiation and concentration), intra-network-firm prices depend on how important a firm is to the network-firm relative to others to resist NF vs NF competition, which translates into its relative centrality within the network that constitutes the network-firm. Consequently, some firms can set higher prices and buy at lower prices, obtaining higher profit rates than other firms from different industries. In other words, in the current form of competition described in Chapter I and characterized by a vertical disintegration landscape where the network-firm is the norm, strong competition is compatible with (fully vertical) market power mechanisms that explain long-run profit rate differentials between tiers (industries). Moreover, the theoretical contributions of Sections 2 and 3 of this chapter have provided an explanation (although certainly not the only one) of the origin of the high returns on investment that the finance sector has been getting since the beginning of the financialization process evoked in Chapter I. Indeed, the reconfiguration of the link between competition and market power in the context of global value chains has allowed some firms to capture higher profits than others to satisfy the financial sector's demands without hindering the strong world-scale price competition the world has seen since the 1980s, when trade liberalized and production became considerably more international in a context in which global value chains became the dominant form of industrial organization at the international level.**

This result, as we had shown in Chapter II, was impossible to obtain by recurring to other existing competition theories. We believe there are two distinct traits of our theoretical contributions that can account for this. **First, contrary to what most competition theories describe (namely those that see market power as an obstacle to competition), we do not consider market power necessarily being a denial of competition.** As shown in **Sections 2 and 3**, in the short-run, market power coordinates competition, as it is what glues together a set of firms within a network-firm and allows the lead firm(s) to coordinate the production process of the network-firm for the whole network-firm to be able to compete on prices with other network-firms. As shown in **Section 4**, in the long-run, competition is on obtaining and reinforcing market power through innovation (both technological and organizational) and through institutional change (mostly by extending the realm of property rights). Firms compete on price both at the final market and at the supply chain level, yet market power is still possible. **Market power arises here from the uneven interdependence between firms in the production process they carry on**

within a network-firm and not from foreclosing competition. Second, as a corollary of the previous point, contrary to both competition theories that see market power only as an obstacle to competition and those that have a positional concept of market power⁸⁶, we do not identify the existence of market power with a departure from the lowest possible price in which competition would result. We have shown that, by exerting fully vertical market power, some firms can set buying and selling prices in their favor and still price competition prevails between tiers of the different network-firms and between network-firms.

We believe that our theoretical contributions have also offered a solution to the two limitations of the existing competition theories identified at the end of Chapter II. First, our theoretical developments consider market power in its fully vertical dimension in a coherent and holistic way. We have seen that the patterns of interdependences that are at the core of firms' market powers extend vertically all along the network-firm and how this interacts with traditional horizontal price competition and NF vs NF competition. In this sense, our concept of vertical market power is fully vertical (i.e. it does not limit vertical market power to direct downstream/upstream links between firms), holistic (it considers not only fully vertical market power, but also other horizontal competition forces) and coherent in the sense that it is compatible with the two above-mentioned horizontal competition forces. Second, contrary to most of the existing competition theories, market power is not identified with pricing over the competitive level. In our theoretical development, fully vertical market power can translate into purchasing inputs from other firms at a low price.

⁸⁶ In Chapter II we have defined positional market power as market power that comes from the strategic obtainment and usufruct of a particular link with other agents as a result of multilateral strategic choices by all of the agents in a competitive context.

Chapter IV: Competition and market power in platform capitalism: the case of trust-based algorithmic coordination firms

Introduction

In **Chapter I** we have characterized a Finance-led form of competition that started in the 1980s and continues to dominate today. We saw that one of its conditions of possibility was the information and communication technologies (ICT) revolution that started in the 1970s (Perez, 2010) and that one of its salient features was the rearrangement of the legal boundaries of the firm around its intellectual-property-defined core competences in a context of vertical disintegration. Moreover, we explained how these two factors (combined with other institutional transformations) gave rise to a particular form of competition in which a new form of industrial organization, the network-firm, came to replace the vertically integrated firm.

In **Chapter II** we reviewed the existing competition theories and we concluded that none of them is able to account for the conjunction of two stylized facts proper to the Finance-led form of competition identified in Chapter I: long-run profit rate differentials and strong price competition.

In **Chapter III** we revisited the theory of the internationally-dispersed network-firm (a.k.a. global value chain) and, based on our conceptualization of it, we developed a theory of competition and market power that takes it as its object. That theory was intended as a contribution to understanding the new form of competition that the network-firm brought about by offering a competition-theory-based account of the coexistence of the two above-mentioned stylized facts.

The goal of this chapter is to contribute to the understanding of another new form of competition that, just like the one centered on the network-firm, was made possible by the ICT revolution and also implied a shrinking of the legal boundaries of the firm around some intellectual-property-defined core competences: competition in the so called "platform economy". Since the scope of the platform economy is extremely wide in terms of organizational forms, forms of competition and business models, we will center our analysis around a specific type of firm that appeared within platform capitalism in the 2000s: (for-profit) trust-based-algorithmic coordination (TBAC) platforms. Although we will provide a detailed characterization of the latter in Section 2, let us by the

moment refer to them as online platforms such as Uber, Airbnb or TaskRabbit that intermediate offline exchanges of goods and services between other agents.

We will divide the chapter in four sections. **Section 1** will overview the technological revolutions that made possible the platform economy and distinguish two trends within it: the sharing economy and platform capitalism. We will show how different types of business models around platforms appeared within the latter in terms of the role played by data, notably by briefly comparing the cases of Google and Amazon. Then we will focus on the history of a particular type of platform-firm: the trust-based algorithmic coordination firm. We will recall the factors that originated its expansion and show its evolution from sharing economy initiatives to for-profit firms as well as the appearance in recent years of a nascent movement trying to reconquer the sharing economy roots, “platform cooperativism”. This will lead us to interrogate ourselves in Section 3 about the competitive dynamics that might explain the shift towards for-profit TBAC platforms that dominate today.

Section 2 will be devoted to characterizing trust-based-algorithmic coordination platforms. We will offer a precise definition that is rooted in a competence-based theory of the firm. We will argue that the novelty of this type of firm lies in the fact that a key element of its core competence is algorithmic coordination of trust-based networked interactions between other agents.

Building on this characterization of the TBAC firm, **Section 3** will study competition and market power dynamics between TBAC firms. Two problems will be distinguished. The first one is competition between TBAC new entrants and traditional incumbents. We will show that current regulation favoring TBAC firms over traditional ones and the static and dynamic efficiency that algorithmic coordination allows for are the two key factors that explain TBAC firms’ competitive advantage over traditional firms. Moreover, we will see how the shift from traditional firms to TBAC firms resonates with the vertical disintegration movement analyzed in Chapter I in that it allows for an amalgam of strong horizontal competition between TBAC firms and traditional firms, on the one side, and vertical market power exertion from TBAC firm owners to some agents that participate in it, on the other side. The second problem is competition between TBAC platforms. We will show how the nature of TBAC platforms elucidated in Section 2 can explain why TBAC platforms’ markets are winner-takes-all markets in which a dominant firm is expected to eventually hold market power. We will support this claim by studying the case of Uber in the main ride-hailing markets of the United States.

1 The rise of the trust-based-algorithmic coordination firm in the context of the platform economy: from technological to organizational revolutions

“The story of the revolution in information technology must be told in two ways: first as a story of technology; second as a story of innovations in business organization and practice. Only the intertwined stories explain how the technology moves out of the laboratory, into the economy, and into daily life.”

Stephen S.Cohen, J. Bradford DeLong and John, Zysman, “Tools for Thought: what is new and important about the e-economy”

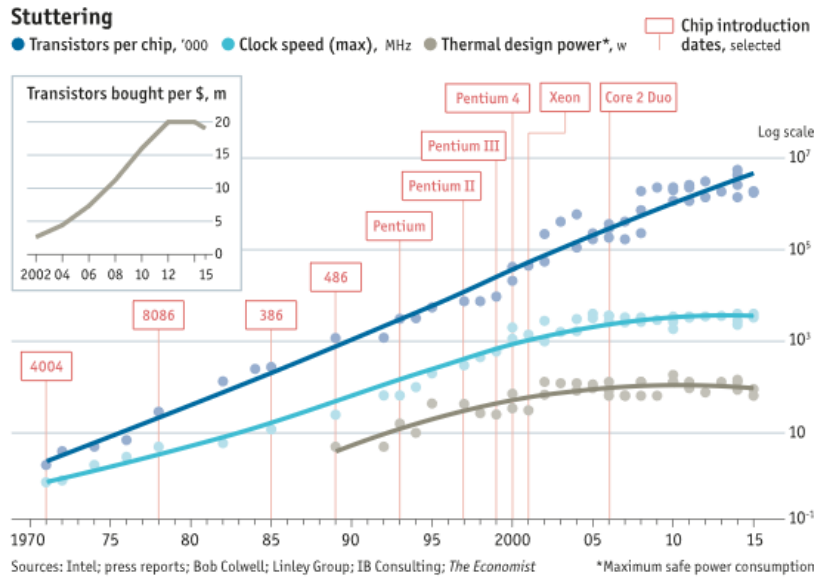
1.1 The emergence of the platform economy

In the 1970s a new technological revolution centered on information and communication technologies started (Perez, 2010) and by the 2000s it made possible the emergence of the platform economy. Nevertheless, the latter is as much an organizational revolution as it is a technological one. **The goal of this subsection is to overview the technological breakthroughs that made possible the emergence of the platform economy and show how they allowed for the appearance of a family of business models in which the interaction between algorithms and the appropriation of data play central yet differentiated roles. In doing so, we will distinguish the sharing economy from platform capitalism.**

The technological revolution that started in the 1970s can be divided into three complementary clusters of innovations that allowed for the rise of the platform economy: the semiconductor revolution, the internet and cloud computing.

In 1965, Gordon Moore, co-founder of Intel, announced in a paper what would be later known as Moore’s law: the density of transistors of a silicon chip (i.e. its power) would double every eighteen months at the same cost. For decades, Moore’s projection has been verified, although, as shown in Figure 21, the tendency has been stagnating since 2012. Nonetheless, the increase in the capacity of microprocessors over the past decades has been staggering. This implies that automated treatment of data passed from being an expensive and inefficient (in the eyes of a contemporary reader) privilege to an economically accessible powerful tool. With the continuous exponential growth in the power of microprocessors, the two first IT revolutions, large computers and then personal computers, came to be.

Figure 20: Moore's Law



Source: The Economist, 2016

The second facet of the ICT revolution was the internet. Far from being a novelty, the first version of what became the internet started with the United States' Defense Department's project ARPANET in 1969. Nevertheless, for decades networking was either restricted to private corporate networks or was limited to public networks with restricted services, such as the French Minitel. The internet as we know it was the result of the invention of the http protocol and the image-displaying browser that compose the World Wide Web. It was not until the 1990s that these two inventions made the scaling-up of networking possible. However, the internet could only scale to the level we know under two conditions. First, by the 1990s the microprocessors revolution had already reached a level that allowed private individuals to possess personal computers that could be connected to the World Wide Web. Second, there were already deployed voice telecommunication networks on which the first World Wide Web could run before other infrastructures came to replace it (Cohen, Zysman, & DeLong, 2000). Once other bandwidth technologies such as optic fiber were developed and deployed during the 2000s, the cost of internet connections dropped dramatically, making the internet widespread.

The third cluster of innovation that made the platform economy possible is cloud computing, a technology that “delivers computing services— data storage, computation and networking—to users at the time, to the location, and in the quantity they wish to consume, with costs based only on the resources used” (Kushida, Murray, & Zysman, 2015). This technology born in the 2000s could only come to be once the internet had become widespread and microprocessors' capacity had reached a certain level of

cost-efficiency. Cloud computing represented not only a technological advance, but mostly a revolution in terms of the business models of many firms. Indeed, the cost of data storage alone is so high that only a few firms can afford it. Cloud computing made technically and economically feasible for firms such as Amazon (Amazon Web Services) or Rackspace to rent out storage space, computation capacity and networking to other firms that cannot afford the sunken capital cost that this implies. Then, with cloud computing, computing expenses passed from being capital expenses to be operating expenses. This opened up the possibility of creating an array of IT firms and business models around it. Before cloud computing, any IT-based service would require onerous capital expenditures. With cloud computing, startups with little capital can focus on developing an application in a garage, renting out all the background computing power, data storage and networking that its functioning requires from net giants such as Amazon or Google that have invested in the necessary fixed capital.

Finally, also during the 2000s, the conjunction of the improvement in microprocessors' capacity and internet technologies (2G, 3G and 4G) gave birth to smartphones, which quickly became a widespread. Then, by the 2000s, as a result of these three technological revolutions (the microprocessors revolution, the internet and cloud computing), personal computers and smartphones that could connect through the internet and access apps of all sorts in one click became affordable and widespread in many countries: the technological conditions for the platform economy to emerge had been met.

With these technologies deployed, an array of new forms of organization became possible. In this context was born what we will call hereafter **a platform economy, which we will define as the set of organizations in which data-fed algorithms (platforms) are at the core of their business model. A business model in turn, can be defined as “the distinctive and fundamental principles and mechanisms by which an organization deploys a strategy to create, sell, and use values (of use and change), in order to fulfill its primary goals” (Harracá, 2017, p. 9)⁸⁷. Then, the platform economy is a set of value-creating organizations in which data-fed algorithms, in as much as they are a new form of routine⁸⁸, are one of the key competences on which the value creation process relies.**

These organizations can be profit-oriented or not, and there is a family of business models that can be built around them. Many distinctions and typologies should be made in order to understand the competitive dynamics that exist within it. It is for this reason that we will focus on one specific type of

⁸⁷ Harracá's definition of a business model is an adaptation of that provided by Benjamin Coriat at the conference “Platform Capitalism & Cooperativism” held in October 7, 2016 at Université Paris Diderot, according to which a business model “describes the principles and mechanisms by which an organization creates, sells and use values (of use and change). These principles must sustain the long-term survival of the project”.

⁸⁸ We will develop this point in Section 2.

platform within the platform economy that we will define in the next section: trust-based algorithmic coordination platforms (TBAC). **More precisely, we will focus on for-profit TBAC, meaning those that belong to platform capitalism (for-profit firms) and not to the sharing economy,** if we define the latter as constituted by non-for-profit organizations.

Indeed, the platform economy can be divided into two families. On the one hand, we have platform capitalism, which comprises all the platform-firms that follow the traditional capitalistic logic. On the other hand, we have the sharing economy, in which platforms are not used primarily for profit goals. Apart from the "for profit/not for profit" criteria, a way to differentiate the two series of platform is to look carefully at the nature of the governance of the platform (Carballa Smichowski & Coriat, 2017). In platforms belonging to platform capitalism the platform is vertically coordinated, which means that the manager of the platform intervenes in the nature of the transaction by setting admission rules and/or the rules of the transaction itself (quality, price, labor conditions, etc.), and it does so pursuing the objective of maximizing the profit of the platform. On the contrary, in platforms belonging to the sharing economy, the actors involved in exchanges can define themselves the nature of the transactions. We can therefore speak of horizontal coordination between peers⁸⁹. Keeping this distinction in mind will be important to understand the different phases of the history of TBAC platforms that we will review in the next section.

Before moving on to that review, **let us point out that the competitive dynamics of for-profit TBAC platforms cannot be generalized to the entire platform economy, in part because of the different roles data plays in platforms' business models.** While in some platforms the appropriation of data is of paramount importance to the business model because the data is the product that is commoditized to create revenue, in others, such as in TBAC platforms, data is a collateral element of the business model.

Let us take the case of Google as an example of the first case. Most of the services the company provides (Google search, Gmail, Google drive, etc.) are free of charge. The superior performance of Google's search algorithm and other products is what attracts a large user base. Nevertheless, value capture comes from commoditizing data. Through the consent of users in the terms of agreement that have to be accepted to use its products, and shielded by trade secret, Google 'appropriates'⁹⁰ the data that is generated by users' searches, emails, etc. This data is then used to sell targeted advertising and, because of all the detailed information that it offers about a precise individual, it is very valuable to advertisers.

⁸⁹ One may notice that this definition and characterization of the « sharing economy » is more restrictive than the definition usually proposed in the literature. On this point, see Carballa Smichowski & Coriat (2017).

⁹⁰ It is not appropriation in the legal sense of the term, since there is not such a thing as property rights over data.

The result of such a business model is that data is the main source of Google's revenue, accounting for more than 90% of it (Harracá, 2017).

In other platforms, although data plays an important role, it should be considered a collateral element of the business model and not as constituting its core, as in the case of Google. Let us take the case of Amazon as an example. Amazon has an impressive variety of businesses. Nevertheless, it has two core businesses. Amazon Web Services is the most profitable one. Its operating income's share of revenue was 25.4% in 2016, and it has been growing exponentially since 2014. In terms of revenue, its retail products represent the core business (67% of its revenues in 2016), although they have been losing ground to Amazon Web Services and other services (third-party sellers and subscriptions) since 2010 (Harracá, 2017). Regarding retail products, Amazon's platform nature allows it to gain competitive advantage over traditional retailers by (Harracá, 2017):

- Lowering search times and costs
- Lowering transaction costs
- Offering an 'unlimited' selection of products
- Benefiting of the network effects of users' reviews of products (the more reviews there are, the more attractive Amazon becomes as an online retailer)
- Profiting from a virtual environment that uses clients' observed behavior to customize the shopping experience (e.g. proposing items to buy based on past purchases and searches)
- Being able to track retailers' offerings on the platform and instantly adapt prices based on competition and demand

All of these competitive advantages are based on Amazon's platform structure. In all cases, it is the capacity of harvesting data that is automatically turned into decision-making through algorithms what gives Amazon the hedge over traditional retailers. Nevertheless, value capture in its e-commerce business still depends on traditional retailing logics: enlarging its customer base through price cuts in order to make revenue over a large base with small margins, and then use that solid client base to negotiate lower prices from suppliers to enlarge margins. On the same line, brick-and-mortar logistics are the key of Amazon's fast delivery, which represents one of its competitive advantages in retail sales. Capturing and treating data through algorithms, contrary to the case of Google, plays a corollary role in the business model of Amazon's e-commerce because it is a source of competitive advantage in the frame of a traditional retailer business model. On the contrary, Google's business model is built around the harvesting of data.

Having reviewed the technological breakthroughs that made the emergence of the platform economy possible in its two versions (sharing economy and for-profit platform economy), and having pointed out the different roles that data and algorithms can play in the business models the platform economy gave birth to, we shall now focus on one particular type of platform-firm on which our study of competitive dynamics will focus for the rest of the chapter: TBAC platforms.

1.2 The emergence and evolution of trust-based algorithmic coordination platforms

We have briefly recalled how a set of technological revolutions in ICT has opened up the possibility of a variety of business models and organizational practices we have characterized as the platform economy. We have also pointed out the large variety in terms of governance (sharing economy vs. platform capitalism) and business models that exists within it and decided to focus on one particular type of platform: trust-based algorithmic coordination platforms. **The goal of this subsection is to do a quick review of the reasons of the emergence of these types of platforms within the platform economy keeping in mind the two variants that exist in terms of governance: for-profit TBAC platforms and TBAC platforms belonging to the sharing economy.**

Practices of networked interaction between individuals sharing a resource are not new. For example, early carpooling clubs date back to World War II in the United States. Nevertheless, a transformation and a large expansion in these types of practices occurred when online platforms started supporting them. The origins of this shift can be timed around the mid-2000s, when internet and smartphone penetration was large enough in some countries for TBAC platforms to reach a critical mass of users. Moreover, the first use of the term is attributed to Lawrence Lessig in 2007 (Kummer, 2007).

One of the main factors that explain the emergence of the TBAC economy is the above-mentioned ubiquity of high-speed internet access and smartphones, which act as an infrastructure that allows almost free communication between individuals at any moment and place (The Economist, 2013; OECD, 2015a). This technological advance has allowed, first, to enlarge the potential pool of members of a TBAC network considerably. Before the internet became widespread, individuals who wanted to engage in networked interactions usually relied on focal points such as bulletin boards located in key points where a community meets (the city hall, the church) or more limited means of communication in terms of reach and speed such as newspapers to connect with each other and build a community. Other options included referral by other individuals or institutions that acted as connectors. This rendered the scope of the community geographically local and small. Most importantly, digital technologies have made it easier

to verify identities (upload an ID, verify users' identities with their Facebook accounts, etc.) and to create reputation systems that allow users to easily verify the communities' opinion of other users' behaviors. This is of paramount importance because, when no common institution or social link connects two individuals that are strangers to each other, they do not have any reason to trust each other. Information and communication technologies have been able to provide this trust that is a precondition for individuals to engage in networked interactions. Organizations such as CouchSurfing, where people from all over the world offer other members of the community accommodation in their homes for free, would have been extremely difficult to build if people could not find each other online and get some sort of signal of how trustworthy other members are. We will come back to this point in the next section.

Moreover, this technological progress has enabled the appearance of TBAC platforms also because of the capacity of real time automated coordination it created. Firms such as Deliveroo base their functioning on it: people order through their mobile phones, providing in one click their address and credit card information needed for the delivery and the payment to be done; deliverers, on the other hand, get the orders in their phones as well as key information such as from which restaurant they should pick it up and how to get there; the restaurant manager also knows who is assigned to pick up the order being cooked; all of them can call or text each other in case there is any problem. Although not all TBAC firms rely on real time automated coordination through mobile phones (some might as well function with traditional webpages resembling discussion forums), part of the sharp increase in the number of TBAC platforms would not have been possible without it. In addition, even TBAC platforms that do not rely on it benefit from real-time coordination through mobile phones. For example, in Airbnb, although the transaction can be coordinated before travelling using desktop computers, the mobile application allows visitors to text hosts in case they are late, or hosts to offer a quick answer to people asking questions about the house or accept accommodation demands before they get access to a computer. It is important to stress that, above all, it is the automaticity of coordination what has helped boosting the development of TBAC platforms. While in the past individuals had to explain each member the standard coordination procedures in a network of interactions and carry them out analogically, internet websites and mobile apps embed these procedures and automatize most of them (we will develop this point in the following section). This lowered coordination costs to a level that encouraged people to join these platforms. In sum, the widespread of internet connectivity and smartphones has allowed to widen the scope of potential TBAC communities both in size and in geographical terms and lowered transaction, coordination and communication costs between individuals, boosting so the development of these platforms (P2P Foundation, 2015).

Although the adoption of certain technologies was a necessary condition for the TBAC economy to take off, other factors have to be accounted for to understand the timing of its development. Some authors signal cultural changes towards preferring accessing goods over owning them, which favors people's participation in TBAC organizations. In some cases, participation is driven by a rise in ecological concerns, which have gained importance as the effects of and the knowledge on climate change increased (Novel & Riot, 2012). For example, using carpooling platforms can be for some persons a way of minimizing CO₂ emissions.

Another factor to take into account to understand the surge of TBAC platforms is the weakening economic situation of individuals that participate in them. From a long-run perspective, the weakening of the labor status and job security experienced in many developed countries since the 1980s (Kotz, 2015) has pushed some individuals to find alternative sources of revenue, especially after the financial crisis of 2008. Many TBAC platforms that were blooming during the crisis offer individuals a way of monetizing their underused assets (rent a spare room on Airbnb, rent their cars through MyWheels, etc.), saving money by renting or accessing for free goods on a platform instead of buying them or having a second part-time job (or even a full-time job) in a TBAC platform (e.g. delivering food in Foodora, driving in Uber, offering services in TaskRabbit, etc.).

It is interesting to point out that throughout history of the development of TBAC platforms two strains, each corresponding to a time period, can be identified. In the early years, a first sharing economy in the sense we gave to the term in the previous subsection started to emerge on the basis of the technological tools mentioned above. Indeed, the first TBAC websites such as CouchSurfing (founded in 2003) or Coivoiturage.fr (founded in 2004, became BlaBlaCar in 2013) correspond to this logic. Couchsurfing, which was for years the largest lodging TBAC platform, was financed by donations and based on self-organized communities of volunteers that worked as ambassadors to spread it and improve its software code. Covoiturage.fr was free and allowed users to communicate with each other through any mean they wished (through the website, by phone, by email, etc.) and set up the pricing mechanisms they would find suitable to share the cost of the ride.

But in the late 2000s and early 2010s, for-profit TBAC platforms started to take over the original sharing economy ones. The cases of CouchSurfing and Covoiturage.fr are illustrative of this trend. In the case of CouchSurfing, its conversion from a not-for-profit corporation to a for-profit corporation in 2011 entailed a shift in its governance structure that washed out its autonomy and decision-making principles: volunteers who had donated time to build the community were not compensated when the company sold equity and the city groups (information hubs for Couchsurfing communities) they had created were

eliminated, software development stopped being collectively carried on through CouchSurfing collectives and the terms of use of the platform were changed so that users had to give away all the rights over their personal data to be able to use it (Gigaom, 2015). Covoiturage.fr underwent a similar transformation as it started to raise venture capital. In 2011, it stopped being free, and in 2014 it raised the fixed rate it charges per ride between 11% and 50% (each corresponding to a total price under or above 8 euros, respectively) and its percentage commission by 25%. In 2014, users were blocked from sharing their phone numbers through the platforms. In 2014, the company set up a commission scheme where users pay more as the booking gets closer to the departure date. Other modifications such as the obligation to pay online (and drivers getting the money between 48 hours and 72 hours after the ride) were made (Evenstrood, 2014). These transformations show how the self-organization of users of the platform was restrained in order to introduce profit-maximizing logics proper to traditional corporations.

Although we have quoted two exemplary cases of sharing economy platforms that, after having become the go-to platform in their respective fields, have shifted to a for-profit corporate model, the rise of this second generation of corporate TBAC platforms has not only been driven by transformations in the nature of initially sharing economy platforms. In other cases, platforms that started as for-profit TBAC platforms in the late 2000s quickly became dominant in their respective fields. This is the case of Uber, one of the most popular ride-hailing platforms, which was founded in March 2009, Airbnb, the most popular lodging platform (founded in August 2008) or the popular freelance labor platform TaskRabbit, founded in 2008. The common denominator of these platforms is that they belong to what we have defined in the previous subsection as platform capitalism. Governance is hierarchically exerted by platform owners that set the rules of transactions and, therefore, the individuals that participate in it cannot be considered peers. Consequently, value distribution is decided by platform owners, which choose the transaction fee they charge users. It is also worth mentioning that in their growing strategies many platforms have bought competitors to grow, as in the case of BlaBlaCar, which bought many foreign competitors to secure its leading position and become the European leader in the carpooling market (Ahmed, 2015).

Finally, a third trend in the evolution of TBAC firms can be identified since the mid-2010s⁹¹: the “platform cooperativism” movement. In recent years, displeased by the working conditions and the uneven value distribution practiced in some dominant platforms, independent users, cities and unions

⁹¹ Based on a media survey, the European Commission identifies the 2012-2015 period as that for which “the ‘honeymoon’ with the ‘sharing economy’ has ended (Codagnone, Biagi, Abadie, & Institute for Prospective Technological Studies, 2016). “Optimistic and utopian narratives have been substituted by accounts of legal disputes and the ‘dark side of the sharing economy’(Malhotra & Van Alstyne, 2014)” (Codagnone & Martens, 2016).

have started creating their own co-owned TBAC platforms. Platform cooperatives resemble for-profit TBAC platforms in their user experience and technological core, but differ in their ownership and governance model. Following the tradition of the social and solidarity economy, these platforms are owned by the stakeholders involved, be it workers (e.g. the ride-hailing platforms Green Taxi Coop or Union Taxi Cooperative) or multiple stakeholders (e.g. the gig work platform Loconomics). In platform cooperatives, governance structures can be characterized as "horizontal" since all the stakeholders have a vote on the decisions to be made by the firm. The platform cooperativism movement can be seen as a return to the original ethos of the sharing economy, but with a strong accent on the importance of ownership and horizontal governance by the community of participants of the platform, something that lacked in many 'naïve' pioneer sharing economy communities and contributed to their decline or even their conversion into for-profit TBAC platforms. Nevertheless, despite this awareness, the platform cooperativism movement is still in its infancy and one can doubt how far it will be able to go if it has to compete with dominant for-profit TBAC platforms, especially considering the winner-takes-all dynamics that can be generated in markets in which they participate, as we will show in Section 3.

Noticing this transformation towards a dominance of for-profit TBAC platforms raises the question of what the competitive dynamics behind this shift are. Are there any characteristics, either proper to TBAC platforms or also present in other markets or types of firms that favor a corporate model that would be more competitive than peer-to-peer alternatives? Moreover, we observe today a tendency toward the consolidation of TBAC giants that hold large market shares and expand aggressively: BlaBlaCar dominates the long-distance carpooling sector⁹², Airbnb has currently over 3 million lodging listings in 65,000 cities and 191 countries (Airbnb, 2017), Uber, (even if it has not made profits for 9 years), outpaces competing American ride-hailing platforms by far in terms of market share and at an increasing speed (FutureAdvisor, 2014). This indicates that there are competitive dynamics that need to be understood to account for the decline of the sharing economy in favor of for-profit TBAC platforms.

In the next sections, we will investigate these competitive dynamics in detail. But in order to do so, we will first need to define precisely what we mean by "trust-based algorithmic coordination platforms", a task to which we will devote Section 2. As we will show, this is not a minor issue, since current definitions lack consensus and present some clear limitations. Our characterization will build on the competence-based theory of the firm we have worked with in the previous chapter. Building on it, we will show in Section 3 how the nature of the TBAC firm and its current regulatory environment render TBAC firms more competitive than traditional incumbent firms. We will see how in this case, as we have shown

⁹² BlaBlaCar's CEO claims that the company had in 2014 between 70% and 90% of the market share in the countries where it was active (Bouleau, 2015).

for the case of the network-firm, vertical market power coexists with strong horizontal competition. Then we will proceed to study the competitive dynamics between TBAC platforms in order to show how they lead to winner-takes-all markets and support this claim with a case study of Uber in the main United States ride-hailing markets.

2 A competence-based definition of the trust-based algorithmic coordination firm

We have so far exposed the technological and organizational transformations that have given birth to the platform economy and, within it, to TBAC platforms in its two variants in terms of governance: sharing economy-oriented ones and for-profit ones. Nonetheless, we have not yet provided a precise definition of TBAC platforms. **The goal of this section is to provide a precise definition of TBAC platforms that builds on the evolutionist theory of the firm. This definition will be the basis on which we will study the competitive dynamics proper to for-profit TBAC platforms in the next section.**

Many terms have been used in recent years to define the same phenomena: ‘gig economy’, ‘on-demand economy’, ‘peer-to-peer economy’, ‘collaborative economy’, ‘access economy’, ‘the mesh’... Among these terms, ‘sharing economy’ stands out as the one with the most widespread use. Nevertheless, its definition is neither consensual nor rigorous and, as we have pointed it out in the previous pages, our use of the term ‘sharing economy’ differs from what it is generally understood by it. Therefore, in order to study competition-related issues in TBAC platforms it is necessary to begin by defining precisely what we mean by that term. In other words, we need to rigorously characterize these new types of firms. There are currently two widespread families of definitions to understand these platforms. On the one side, there are definitions based on the idea of access over ownership and/or network interactions between individuals channeled through a digital platform. On the other side, these platforms are defined as a multisided market. Although these two families of definitions capture some key features of the TBAC firm, we will show that they are not sufficient to characterize it thoroughly.

Let us begin with the first family of definitions. Novel and Riot define what they call “sharing economy” as an economy “based on network pooling of resources owned by each person”⁹³ (Novel & Riot, 2012, p. 35). Gansky uses the term ‘mesh’ to designate organizations where “in sum, it is about going from a world where we own everything that we use to a world where access is imposed over property” (Silicon

⁹³ The translation is ours.

Maniacs, 2011). According to Jeremy Rifkin, ‘collaborative commons’ are “a digitalized space where providers and users share goods and services” (Rifkin, 2014). Benjamin Tincq, co-founder of Ouishare, defines what he labels as well “sharing economy” as “the set of social practices and business models based on horizontal structures and members contributions of a community” (Tincq, 2014)⁹⁴. Rachel Botsman, in turn, speaks of “an economic model based on sharing underutilized assets from spaces to skills to stuff for monetary or non-monetary benefits. It is currently largely talked about in relation to P2P marketplaces but equal opportunity lies in the B2C models” (Botsman, 2013). On the same line, the European Commission defined the collaborative economy in a guideline as “business models where activities are facilitated by collaborative platforms that create an open market for the temporary use of goods and services, often provided by private individuals” (European Commission, 2016). OuiShare takes another of Botsman’s definitions to define the ‘collaborative economy’ as “initiatives based on horizontal networks and participation of a community. It is built on ‘distributed power and trust within communities as opposed to centralized institutions’ (R. Botsman), blurring the lines between producer and consumer. These communities meet and interact on online networks and peer-to-peer platforms, as well as in shared spaces such as fablabs and coworking spaces” (OuiShare, 2016). Benita Matofska, founder of The People Who Share, defines the “sharing economy” as “a socio-economic ecosystem built around the sharing of human, physical and intellectual resources. It includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organisations” (Matofska, 2016). Laure Wagner, spokesperson of BlaBlaCar, defines the “sharing economy” as “the optimization of under-exploited resources thanks to a digital system that allows approaching supply to demand, to create a community of suppliers and demanders” (Wagner, 2014)⁹⁵. It is important to stress that Wagner highlights along with Valérie Peugeot that “if there is not a technical online device it is not sharing economy” (Peugeot, 2014)⁹⁶. Arun Sundararajan, an economist that specializes in the platform economy, defines what he also labels “sharing economy” as an “economic system” that has five characteristics: largely market-based (i.e. the creation of markets and enabling of exchanging of goods and emergence of new services); high-impact capital (it allows “everything, from assets and skills to time and money, to be used at levels closer to their full capacity”); “crowd-based ‘networks’ rather than centralized institutions or ‘hierarchies’” and “blurring lines fully employed and casual labor, between independent and dependent employment, between work and leisure” (Sundararajan, 2016).

Three main characteristics that emerge from these definitions:

⁹⁴ Ibid.

⁹⁵ Ibid.

⁹⁶ Ibid.

- The existence of a network of interconnected agents at the core of the activity
- The existence of a digital infrastructure that allows networked interactions
- Access over ownership: underused goods owned by some agents are accessed by others than do not need to buy them to use them

The second family of definitions identifies these platforms as multi-sided markets that use a digital platform. These “are roughly defined as markets in which one or several platforms enable interactions between end-users, and try to get the two (or multiple) sides ‘on board’ by appropriately charging each side. That is, platforms court each side while attempting to make, or at least not lose, money overall” (Rochet & Tirole, 2006). A condition for multisided markets to exist is the presence of distinct and complementary types of users that the platform puts in touch (those who need a ride and those who offer it, those who want to rent or share a spare room and those who are looking for one, etc.) and the existence of positive network effects between the groups (Rysman, 2009). For example, the more people there are offering a spare room in Airbnb (first side of the market), the more useful it becomes for those who are looking to occupy a spare room (second side of the market) to use the platform, and the more useful it becomes to advertisers who want to reach the biggest possible audience (third side of the market).

It is important to point out that when the literature on multisided markets uses the term ‘platform’ it does not necessarily refer to digital platforms. For example, a speed-dating center can be a platform that, without using any digital tool, puts in touch two complementary groups of people that create positive network effects between them. Some authors (Demary, 2015; Evans & Schmalensee, 2013; Hagiu & Wright, 2015a, 2015b; Lougher & Kalmanowicz, 2015) have taken this definition of multisided markets to define TBAC platforms as multi-sided markets where the platform is digital.

Although these families of definitions capture some of the main characteristics of the TBAC firm, they have shortcomings. Regarding the first family, while the first two characteristics it identifies are general to all TBAC organizations, the last one (access over ownership) refers only to the most popular type of TBAC platforms, collaborative consumption platforms (e.g. car-sharing platforms, home-sharing platforms, etc.), where individuals own physical assets they rent or let other individuals use for free under certain conditions. Therefore, the ‘access over ownership’ characteristic does not contemplate gig-work platforms that are generally considered to be part of the TBAC such as TaskRabbit, for example. The multisided market definition has two shortcomings. First, it does not see any specificity in TBAC platforms in respect to multisided digital platforms in general. It simply puts them as examples of digital multisided platforms of which are also part, for example, online market places, social networks or dating apps. As we will see in subsection 3.1.2, this theoretical framework has an effect on how competition

dynamics between TBAC platforms are identified by some authors. Second, it omits the particular social form that the organization of labor and exchange take in TBAC organizations: in TBAC organizations, labor and exchange, contrary to what happens in traditional firms, is not driven by employment relationships. A shortcoming shared by both of these families of definitions is that they omit the role TBAC firms play in coordinating production and exchange through algorithms embedded in the platform.

Taking into account the contributions and the shortcomings of the existing definitions, we propose a definition we will adopt hereafter. **We define the TBAC as a way of producing and/or distributing goods or services (either in exchange for money or not) based on network interactions between agents channeled through digital platforms and where users' participation is not driven by employment relationships. TBAC platforms have the following characteristics:**

- a) They set the conditions of network exchange and/or production (including labor conditions and value distribution) through algorithmic coordination.**

- b) They create a digital support that not only serves as a virtual matchmaking space that allows network interactions to take place in physical space *stricto sensu*, but also incorporates mechanisms such as reputation systems and third-party identity verification that make these interactions viable.**

Point a) shows the specificity and the novelty of this type of firm regarding its nature from a competence-based theory of the firm. According to this theory of the firm, firms are a device for coordination and knowledge treatment through routines that form their core capabilities (Nelson & Winter, 2004). The latter can be defined as “a particular way of associating and combining fragmentary competences embedded in individuals in order to perform a task”⁹⁷ (Coriat & Weinstein, 2010). Following this theory, we argue that the TBAC firm is characterized by the fact that one of its core capabilities is algorithmic coordination (Lee, Kusbit, Metsky, & Dabbish, 2015; Rosenblat & Stark, 2016; Schildt, 2017)⁹⁸ of network interactions of other agents (typically individuals) located outside of the legal boundaries of the TBAC firm. Indeed, regardless of the wide range of markets in which these firms participate (transportation, accommodation, gig-work, etc.), the routines that form their core capabilities always

⁹⁷ The translation is ours.

⁹⁸ Our concept of ‘algorithmic coordination’ resembles that of ‘algorithmic management’ found in the papers we have just quoted. Nonetheless, the two differ in that, while ‘algorithmic management’ refers to the coordination and control of labor from the platform to workers, ‘algorithmic coordination’ takes into account a broader spectrum of agents because it also includes coordination between the platform and consumers, between consumers and workers and between all types of users of the platform and third parties.

consist in coordinating production and/or exchange between private individuals through algorithms embedded in the platform that are ‘fed’ by different types of data generated by users. Data on inventories, billing, payment, geo-localization, within-platform interaction between individuals and so on are collected by the platform. The platform offers an automated response to the situation described by these different pieces of data in order to coordinate production and/or exchange between individuals both in a ‘soft’ manner (by giving them incentives) and in a ‘hard’ manner (by giving them instructions). In other words, the algorithmic coordination routines of the TBAC firm “combine fragmentary competences embedded in individuals” *that do not have a contractual relationship with it beyond the terms and conditions of use of the platform* “to perform a task”. These routines constitute one of the core capabilities of the TBAC firm, although not its only core capability. It is important to stress that algorithmic coordination goes beyond matchmaking. In TBAC platforms, algorithms not only put in touch two sides of the market: they embed the conditions of exchange and/or production between individuals so that a series of tasks can be performed *in a particular manner*. While matchmaking platforms such as e-commerce websites limit themselves to offering a digital environment that facilitates matchmaking between two sides of a market, TBAC platforms also coordinate the performance of the tasks that take place after the matchmaking and/or direct the matchmaking: Uber sets the route and makes sure drivers stick to it; Deliveroo coordinates the logistics between deliverers and restaurants in real time; Airbnb gives more visibility to listings that comply with certain criteria (instant booking setting, good reputation, activity rate, cancellation rate, etc.) and gives automatic regular ‘advice’ to hosts on their behavior towards guests and their listings so they will get more bookings, inducing so users to interact in a certain manner, which exceeds mere matchmaking. In sum, TBAC firms’ algorithms are hierarchical exoskeletons that pierce the legal boundaries of the firm, reaching the market sphere where agents interact with each other *through and coordinated by algorithms*.

As crucial as algorithmic coordination is to characterize the TBAC firm, it is not sufficient. If we were to limit ourselves to this part of the definition, we should include all platforms in which network production or exchange is somehow automatically coordinated in the TBAC firm category. In that case, the online peer-to-peer encyclopedia Wikipedia should be included, since it contains all the features described above: based on data on contributors’ experience and the content of a particular article, the platform gives them differentiated rights to contribute to the article (editing, erasing, adding, etc.), coordinating so network-based production of knowledge in an automatized manner. The same could be said of online games that allow for algorithmically coordinated network interactions between players.

This leads us to the second part of our definition expressed in point b). TBAC platforms are not simply a digital space that allows individuals to interact in a certain manner coordinated by the platform. They also

offer mechanisms that make interactions between individuals in an online platform viable. The two main ones are reputation systems and third-party identity verification. For certain interactions to take place, individuals require a minimum amount of trust without which they would never engage in the transaction⁹⁹. In traditional firms, trust is assured by the firm itself, as it is solely responsible for the services its workers (independently of their contractual status as employees of the firm or individual contractors) provide in their name. Nevertheless, in TBAC platforms, services are provided between individuals that are not part of the firm and for whose performance the firm is not responsible. Then, in order to supply trust, firms recur to reputation systems and third-party identity verification of individuals. While in some network-interactions-based platforms such as dating apps or some online games engaging in network interactions do not require trust, it is crucial in other ones. In effect, TBAC firms do not algorithmically coordinate any kind of network interaction; they coordinate those that require trust to take place. For example, people would hardly rent their houses to total strangers using Airbnb instead of a certified agency if it was not for the reputation system set up by Airbnb and its identity verification screening process. These mechanisms work as a signal to hosts that tells them if the users wanting to rent their houses are trustworthy. Reputation systems are therefore a condition for TBAC business models to work (Sundararajan, 2016), and they are very effective in proving users with the trust required for them to engage in certain network interactions with each other¹⁰⁰. Nevertheless, it should be noted that these trust-creating mechanisms are not perennial and that they depend on the reputation of the firm that provides them. For example, recent scandals of different sorts with the ride-hailing company Uber (accusations of sexual harassment within the company, implantation of the Hell spy software in its clients cellphones¹⁰¹, false advertising to drivers, deceiving law enforcement in some cities, among others) have affected the trust that users put on the platform itself, regardless of the individual behavior of its workers and users (The Guardian, 2017). Then, trust-creating mechanisms are necessary but not sufficient conditions for individuals to trust a TBAC platform. Identifying this feature of TBAC firms is primordial because it allows us to clearly differentiate TBAC platforms from other network interactions-based platforms where algorithmic coordination takes place.

⁹⁹ In the PwC Report “The Sharing Economy”, 89% of the respondents agree on the fact that the “sharing economy” is based on trust between providers and users.

¹⁰⁰ A study by the leading ridesharing platform BlaBlaCar shows that the level of trust its users have in each other is close to the one they have in friends. See <https://www.blablacar.com/wp-content/uploads/2016/05/entering-the-trust-age.pdf>

¹⁰¹ This spy software allowed Uber to track drivers that were also working for its main American competitor Lyft in order to target economic incentives to them so that they would work less for Lyft. The use of Hell was brought to court in the *Michael Gonzales v Uber Technologies, Inc*, Case 3:17-cv-02264-JSC, U.S. District Court for the Northern District of California.

Finally, let us stress that our definition describes the TBAC firm as a particular form of social and technical organization of labor. As mentioned above regarding the platform economy in general, this particular way of organizing labor can be done following a variety of governance (traditional capitalist firms, cooperatives, mutual societies, commons, etc.) and business models (charging a fee per transaction, revenues through advertisement, revenues through the use of personal data, financing through members' contributions, crowdfunding, etc.) Moreover, property rights over physical and intellectual assets in the community can take many forms. In this manner, both sharing economy TBAC firms and for-profit TBAC firms fall into this category despite the deep differences we have pointed out between them in the previous section. Nonetheless, **one should bear in mind that the analyses that we will provide in the following section refer exclusively to for-profit TBAC firms.** Indeed, since TBAC firms belonging to the sharing economy do not have the same market-conquering and profit-oriented goals that for-profit platforms have, the competition and market power dynamics we will analyze in the following pages do not apply to them.

3 Competition and market power dynamics in for-profit trust-based algorithmic coordination firms

In the previous section we have defined the TBAC firm following a competence-based theory of the firm. This was a necessary first step since, without a precise definition, the fuzziness of the different terms usually employed to characterize these types of platforms might create ambiguities about the object of our study. Moreover, as we will show in this section, the characterization of the TBAC firm done in Section 2 will be of paramount importance to understand the competitive dynamics proper to these platforms. Two sets of competitive dynamics need to be analytically distinguished. The first one (subsection 3.1.1) is competition between TBAC firms and traditional (i.e. non-TBAC) incumbent firms in their respective markets (lodging, gig work, ride-hailing, etc.). The second one is competition between TBAC firms (subsection 3.1.2). Given the sharp differences between the two types of firms, differentiated dynamics are expected. While the first competition logic will help us understanding the rapid penetration of for-profit TBAC firms in many markets, the second one will give us insights on how these markets might evolve in the future.

Before starting analyzing these competitive dynamics, let us point out that, although TBAC generally operate in many countries, the markets in which the competitive dynamics that we will analyze in this section take place (as the study of the case of Uber in subsection 3.1.2.3 will show) are local markets geographically circumscribed to a territory (e.g. a city). This is the case because platforms compete to

attract users that carry on offline transactions through the platform and those transactions are themselves defined in the scope of a territory. For example, a platform might dominate the lodging market in Paris but be a small player in that market in London.

3.1.1 Competition between trust-based algorithmic coordination platforms entrants and traditional incumbents

The literature on competition issues related to TBAC platforms covers many different problems that range from new and challenging topics like algorithmic collusion¹⁰² (Ezrachi & Stucke, 2015) to more traditional discussions such as barriers to entry. Nevertheless, when it comes to competition issues related to TBAC platforms, a lot of the attention of scholars, antitrust agencies and the media has been devoted to competition issues that arise between new entrant TBAC platforms and traditional firms in certain markets (e.g. Airbnb vs hotels, Uber vs taxis, etc.). This is not surprising. If we take these two examples, which represent the two markets where TBAC platforms have expanded the most, we can see how TBAC platforms are paving their way into markets that had been so far dominated by traditional firms. In the case of lodging, an empirical study based on 59 United States cities (Lane, Woodworth, & others, 2016) shows that Airbnb, which dwarfs competing platforms, has a share of *all* hotels accommodated demand that, although small (which is understandable when calculating one firm's demand as a share of hundreds'), "has grown significantly [between October 2014 and September 2015] and that this share becomes more or less relevant to hotels depending upon the time of the year". The analysis concludes that "Airbnb has and will continue to encroach on the business of the traditional lodging". The case of ride-hailing is probably the one that has create more tensions between incumbents (mainly taxis) and ride-hailing platforms around the world, with taxi drivers protests having spread across countries. The scare available evidence on Uber's market share compared to taxis' confirms that ride-hailing platforms are a serious threat to the taxi industry, since it shows that Uber is replacing the latter in Los Angeles (Nelson, 2016), in all the boroughs of New York (Brooklyn, Queens, Manhattan, Bronx and Staten Island) (Fischer-Baum & Bialik, 2015; Schneider, 2016a, 2016b) and, in the case of business travelers, in all main cities of the U.S (Certify, 2015).

Incumbents argue that TBAC platforms practice unfair competition by recurring to business models that allow them to bypass the constraining regulations and economic costs they have to bear. In some cases they have also accused TBAC platforms of practicing dumping. TBAC platforms, on the other side,

¹⁰² Algorithmic collusion refers to collusion that takes place (tacitly or explicitly) through algorithms without human interference.

respond that regulation is outdated and that it should be adapted to fit their innovating business models which introduce competition by offering a better service at a lower price. It is important to highlight that the validity of these assertions depends heavily on the regulatory landscape, as regulations of different aspects affecting TBAC platforms and traditional incumbent's competitive advantages (sectorial regulations, taxation, labor...) vary considerably from country to country and, in some cases, even from city to city within the same country. However, in their analysis of this conflict, competition authorities from all over the world have unanimously sided with TBAC platforms. When referring to the D.C. tax commission's argument on unfair competition being practiced by ride-sharing platforms, the U.S. Federal Trade Commission stated:

"The staff comments recommend that DCTC avoid unwarranted regulatory restrictions on competition, and that any regulations should be no broader than necessary to address legitimate public safety and consumer protection concerns... The comments recommend that DCTC allow for flexibility and experimentation and avoid unnecessarily limiting how consumers can obtain taxis." (Federal Trade Commission, 2013)

In the context of a constellation of local regulatory landscapes that differ much from those found in the United States, the other most important antitrust agency, the European Commission, defends the very same position as the FTC. Commission Vice-President Jyrki Katainen, responsible for Jobs, Growth, Investment and Competitiveness, said: "A competitive European economy requires innovation, be it in the area of products or services. Europe's next unicorn could stem from the collaborative economy. Our role is to encourage a regulatory environment that allows new business models to develop while protecting consumers and ensuring fair taxation and employment conditions" (European Commission, 2016).

On the same line, the German Antimonopoly Commission called to fix existing regulation in the transport and the accommodation industries to eliminate "regulatory restrictions for market entry" to new entrants that include TBAC platforms (Monopolkommission, 2015)

The Spanish antitrust agency, CNMC, argues in its preliminary findings of its upcoming report on TBAC platforms that "a number of unnecessary and/or disproportionate restrictions on competition were found in sectorial and horizontal regulations, in particular, in the markets for transport and tourist accommodation. These restrictions impede the users to fully benefit from the potential benefits that would be derived from the new entries in the market" (CNMC, 2016).

Discussions on competition issues related to TBAC platforms by antitrust authorities have therefore not only focused on competition between new entrants and incumbents, but, within this topic, they have paid special attention to its regulatory dimension. This is not a minor issue regarding the competitive advantages TBAC platforms might have over traditional incumbents. Anderson and Huffman (2017) consider that TBAC firms “include the possibility of ‘regulatory disruption’ as a means to avoid regulatory limits and costs that burden established firms. This happens when “whether intentionally or otherwise, sharing economy enterprises take advantage of regulatory disruption to achieve competitive scale” (...) “Achieving firmlike stature while retaining the convenience of enterprises comprised of independent contractors constitutes regulatory arbitrage and possibly regulatory disruption” (Anderson & Huffman, 2017). Discussions and conflicts regarding the regulation of TBAC platforms cover many areas that range from food safety to antitrust concerns. Nevertheless, not all of these are used with the purpose of “regulatory arbitrage”, which is to avoid regulatory costs (Kaplan, 2014). When investigating the reasons behind TBAC platforms’ competitive advantages over traditional incumbents, three regulation-related reasons stand out: the classification of platforms as ‘digital marketplaces’ instead of as service providers, the classification of workers as independent contractors instead of as employees and fiscal elution.

The fact that platforms are not considered service providers (i.e. the company that provides the final service to consumers, such as transportation in the case of ride-hailing platforms) gives them in many cases the opportunity to enter markets without restriction, while in some markets entry is regulated by local governments. For example, while hotels need to obtain licenses to operate, lodging platforms can monetize the accommodation market without being themselves legally considered as services providers, and therefore without needing to apply for licenses. Similarly, in the ride-hailing market, while the number of taxis is limited by the number of medallions cities establish, ride-hailing platforms have entered the market as suppliers of the same service bypassing the need of purchasing medallions. Moreover, not being considered service providers entails several regulatory advantages in terms of taxation, health and safety regulations, insurance liability, lessor liability or price-regulation, among others. In all of these cases, the ‘digital marketplace’ status exonerates platforms from the obligation to meet the regulations that traditional incumbent competitors have to follow. This not only gives platforms more flexibility but also lowers their operation costs. It should be noted that the recent opinion of the European Court of Justice on the 'Uber Spain' case¹⁰³ classifies Uber as a service provider, rejecting the ride-hailing platform's claim of being an "information society service". This opinion might create a

¹⁰³ C-434/15 *Asociación Profesional Elite Taxi* ('Uber Spain Opinion') EU:C:2017:364

precedent that could limit TBAC firms' competitive advantage over traditional firms arising from the former's legal classification.

TBAC platforms that are labor-intensive (e.g. ride-hailing, gig-work, delivery, etc.) benefit from another regulatory advantage: the classification of workers as independent contractors. In most of these platforms, workers are independent contractors, although in most occasions they have to follow orders from the platform just as in a traditional boss-employee relationship. The competitive advantage of this (miss)classification is evident: while traditional incumbent firms have to pay welfare costs and offer benefits to their employees (paid vacations, sick days, etc.), TBAC platforms can save on these costs. Fortune magazine has estimated that if Uber had to pay the corresponding costs of having all of its drivers registered as employees it would cost 4.1 billion U.S. dollars, which represents a non-negligible 8% of the company's valuation at the time (51 billion U.S. dollars)¹⁰⁴. Moreover, this status allows TBAC firms to avoid having to negotiate with unions, although protests by gig-workers of these platforms are becoming more and more common, as the strikes from workers of Foodora, Deliveroo and UberEats have shown (Tassinari and Maccarrone, 2017).

Finally, it is easier for TBAC platforms to practice tax avoidance. Tax avoidance refers to all the legal means by which firms reduce the total amount of taxes to pay. Although this is not a practice exclusive to TBAC firms, the fact that they are digital firms makes it easier for them to practice it. This is so mainly because they can easily use transfer prices between subsidiary companies to charge for the use of their immaterial assets (software, databases and brands), and, in doing so, shifting all the profits to companies located in fiscal havens. Given that immaterial assets are more difficult to price, this method of tax avoidance is easier for TBAC platforms than for traditional incumbents, which gives the former a competitive advantage over the latter (Collin and Collin, 2013). Indeed, firms like Uber (O'Keefe and Jones, 2015) or Airbnb, which has more than 40 subsidiaries (Kocieniewski, 2016) elude taxes to surprising levels.

It is therefore clear that the regulatory environment currently benefits TBAC firms over traditional ones. Depending on the analysis made, this could be seen as unfair competition (the consequence being that current regulation affecting incumbents should be applied to new entrants), as incumbents claim, or the result of outdated regulation that should be fixed to accommodate TBAC firms in their respective markets, as antitrust agencies advice. We would not like to go beyond this point on this topic. A thorough analysis would require analyzing each sector separately on a country-by-country basis and even at the

¹⁰⁴ The 4.1 billion number is nonetheless an overestimation, since not all of Uber drivers work on a regular basis or even part-time.

municipality level, which would certainly divert us from the goal of this chapter. It is sufficient for the purposes of this chapter to conclude that regulation of different aspects affecting both TBAC firms and their traditional competitors is a factor to take into account in order to explain why TBAC firms have been able to outcompete traditional incumbents. However, it is not the only factor.

We would like to turn now to what we believe is the second main factor that explains the competitive advantage of TBAC firms over their traditional rivals: efficient routines. As we have seen in the previous subsection, the routines that form one of the core capabilities of TBAC firms are algorithmic coordination routines.

Routines are conceived by the main authors of the competence-based theory of the firm as analogous to software (Cyert & March, 1992; Feldman, 2003; Gioia & Poole, 1984; March, Simon, & Guetzkow, 1993). Nelson and Winter (2004, p. 73) put it this way: “we use ‘routine’ in a highly flexible way, much as ‘program’ (or, indeed, ‘routine’) is used in discussion of computer programming. It may refer to a repetitive pattern of activity in an entire organization, to an individual skill or, as an adjective, to the smooth uneventful effectiveness of such an organizational or individual performance.” The key point of this analogy is the fact that routines are automatic. This is what explains the economic efficiency of routines over deliberation and contracts, which entail heavier coordination costs (Coriat & Weinstein, 2010). By assuring an almost entirely software-based coordination process, TBAC firms give individuals the possibility of following routines that can be more efficient to perform a task (renting a room, getting a pipe fixed, getting a ride) than recurring to a traditional firm. In sum, algorithmic coordination, because of the extreme automation of responses that it allows for, can create a routine more efficient than non-algorithmically coordinated routines. Let us take the example of lodging to exemplify this. A traditional agency would contact both the host and the guest and offer them possible candidates on both sides according to the preferences they have declared (for example, the guest could want a house with a yard and the host might only accept reservations from non-smokers, three people maximum). Then these two clients would sign contracts with the agency and arrange the arrival details with it. In a TBAC firm such as Airbnb, the coordination process is almost entirely automated. Guests can find in a few clicks the most suitable options by themselves with the help of algorithms that, based on their profiles and past experiences using the platform, pre-filter the lodging that are more likely to fulfill their needs, and then book the house in one click. Hosts can get automatic bookings for the days where they have declared to the platform the house to be free, and automatically pre-filter what kind of users they want and the house rules they should comply with (for example, high reputation, non-smokers, no pets) as well as the prices and amounts of days they would like to set for different periods (for example, charge more during weekends, ask for a minimum stay of three days) or cancellation policies. The payment is done

automatically from the platform without any need to sign anything. Deliberation is minimized and contracts reduced to one click when both users accept the terms and conditions of the platform, which takes care of the rest almost entirely by recurring to algorithms that offer automated responses. In sum, algorithms enhance the cognitive efficiency and reduction of complexity that is proper to organizational routines (M. D. Cohen et al., 1996; March, Simon, & Guetzkow, 1993; Simon, 2008). Then, algorithmic coordination creates efficient routines that translate into different types of efficiencies for TBAC platforms such as lower transaction costs (e.g. a few clicks on a smartphone vs manual/face-to-face coordination), increased capacity utilization of assets or information efficiencies (e.g. ride-hailing using drivers' smartphone GPS to dispatch the nearest one vs radio dispatchers consulting drivers through the radio and deciding on the dispatch based on their answers) (Edelman & Geradin, 2015).

We have just described why algorithmic coordination represents an organizational routine proper to TBAC firms that can explain its superior *static* efficiency over traditional firms. However, routines are also a source of dynamic efficiency. In their cognitive dimension, routines are, as mentioned above, problem solving devices. These devices evolve through time to improve the way the problem is solved either because the environment of the firm changes or because a more efficient way of solving the device within the same environment is found. The set of routines structures learning dynamics (Coriat & Weinstein, 2010). At this point we have to be careful with the analogy between routines and genes that the evolutionist literature makes. Changes in routines (the genes of an organization) are assimilated to genetic mutation, but there is a major difference between the two. While genetic mutation is random, changes in routines are not. In order to change their routines, firms employ "meta-routines", which are the routines that deal with the modification and adaptation of lower-level routines (Nelson & Winter, 2004). Meta-routines are the result of the evaluation of the performance of past routines in their selection environment, i.e. the market in which firms compete. In order to do so, firms store and analyze information on how their past routines have been carried on and how they have performed in the market (the selection outcome of the routine), and then proceed to make changes in accordance following a meta-routine.

TBAC firms have an advantage over traditional firms regarding this source of dynamic efficiency because they possess a much larger pool of information about the execution of their routines and their market outcomes. Indeed, while traditional firms usually have, in addition to individuals' non-codifiable knowledge, databases where they store some aspects of the development of their routines, TBAC firms store every single step of the organizational routines they facilitate because each step takes place within the platform. From every single piece of information a user has unwillingly and effortlessly generated while looking for food on Foodora (what kind of food he/she likes, at what hour, from where, for how

much people, how much he/she spends, the restaurants he/she has checked out but declined, the time he/she spent in each possible option, etc.) to deliverers' generated information (response time, distance traveled, path taken, etc.) to restaurants' generated information (the dishes people order the most, when they order them, how much they spend, how it compares to other restaurants in the neighborhood offering similar food, etc.), TBAC platforms store it. This allows TBAC firms to speed the process of mutation of routines for two reasons. First, TBAC firms count with more information about their past routines and their outcomes than non-TBAC firms, which improves the possibilities of mutating routines into more efficient ones. Second, the fact that this information is largely codified in databases allows for the automation of meta-routines through the use of algorithms, which speeds up the mutation process. Moreover, machine learning makes possible an automated process of modification of meta-routines. For example, Foodora could realize through data analysis that people in a certain neighborhood tend to order sushi for four on Friday nights, but that whenever they have to spend too much time scrolling through a vast menu they get tired and end-up ordering something easier like pizza. Then, it can adapt its routines by displaying more sushi restaurants and highlighting the most popular combos for four people they offer when users log in that certain neighborhood on Friday nights. A traditional firm would have to go through an expensive and more time consuming market research based on questionnaires or interviews with a sample of users (instead of all its users) to obtain this knowledge and adapt its routines in consequence.

It is important to point out that this does not mean that the fact that TBAC firms possess almost every piece of information related to the execution of their routines and their outcomes in a codified format allows them to automatically find the optimal solution to every problem using algorithms. In Dosi and Marengo's words, "information about states of the world, solution concepts, and admitted rules –no matter how 'perfect'- are by themselves insufficient to automatically derive in *general terms* any solution algorithm and hence, a fortiori, the optimal one. In order to do so, one requires also some form of preexisting *knowledge* and some imperfectly definable procedures, which are usually the product of inferential induction, analogy, and problem framing but also of socially constructed norms and bodies of knowledge" (Dosi & Marengo, 1994, p. 56).

Now that we have elucidated the static and dynamic sources of efficiency that contribute to explaining the competitive advantage of TBAC firms that compete horizontally with non-TBAC firms, we can understand how this efficiency relates to the vertical market power TBAC firms possess.

As explained above, algorithmic coordination enhances static and dynamic efficiency which, in addition to a regulatory environment that currently favors TBAC firms over traditional ones, allows the former to offer the same products as the latter at a lower price and with an improved user experience (i.e. it gives

them a competitive advantage). This widens the market share of TBAC firms and, therefore, makes them more attractive to professional workers in the case of business to consumers (B2C) TBAC firms as, for example, Uber (drivers), or TaskRabbit (individual contractors that perform different tasks) that otherwise would have worked as employees of traditional firms. We can see here a pattern similar to the one studied in Chapter III when analyzing fully vertical competition in global value chains. The evolution from traditional service providers to B2C TBAC firms (for example, from a taxi company to a TBAC ride-hailing app) represents the fallback of the firm to a core competence (in this case, running a ride-hailing service, a core competence that relies to a great extent –although not exclusively- on algorithmic coordination of trust-based network interactions) that renders the production process more efficient and cheaper for final consumers (which shows that horizontal competition exists) but that, at the same time, renders subcontractors more dependent on the firm than the firm is dependent on them, which gives it vertical market power and, therefore, the possibility to offload risk to them and capture more value. In B2C TBAC platforms, regardless of the market analyzed, as said before, the core competence of the firm builds to a large extent on algorithmic coordination of trust-based network interactions. B2C TBAC firms create an efficient coordination process that renders the production process of the service offered to clients more competitive than that of traditional firms. This, in turn, requires that members of the supply chain (in this case, individual contractors using the platform) accept working with the B2C TBAC firm in order to access the final client base that is seduced by the cheaper and better service rendered possible by this more efficient core competence. But as the core competence reduces the scope of the production process carried on by the firm and the other members of this production process (individual contractors) are dependent on the firm, they have to bear much of the cost of capital and accept an unfavorable distribution of value set by the B2B TBAC firm. This logic can be exemplified with the case of Uber. Drivers are forced to work for it because they can find there more clients than in brick-and-mortar transportation companies, since Uber's clients benefit from a better user experience and lower prices. But drivers, just as subcontractors of lead firms in global value chains, have to bear most of the capital costs (using their own vehicle, paying for the gasoline and the insurance, etc.), which lowers the cost of capital for Uber, boosting so its profit rate. Moreover, the dependence they have in face of Uber gives the latter the possibility to take a large portion of the value created. Uber's commission ranges between 25% and 30%, which is considerably high given that marginal costs are virtually entirely supported by drivers. It is important to clarify that this is only the case in for-profit TBAC platforms, those belonging to the sharing economy are based on free cooperation of equals and decision making is not unilaterally held by one stakeholder.

We can see how the same logic of vertical disintegration as a process that combines strong horizontal competition through efficiency gains and vertical market power that affected most industries that have adopted global value chains as their form of industrial organization takes place with the appearance of B2C TBAC firms. In the latter, algorithms play the role lead firms' governance plays in global value chains, bridging markets and hierarchies.

We have so far studied competition and market power dynamics proper to competition between entrant TBAC firms and incumbent traditional firms. Nevertheless, the 'incumbents vs new entrants' conflict, although relevant, is not the only interesting competitive dynamic the surge of TBAC firms has generated. Other competition issues are arising around TBAC platforms that governments should start paying attention to. In Balaram's words, "in allowing sharing platforms free rein, governments turn a blind eye to both the monopoly power of incumbents and of emerging competitors in mainstream markets" (Balaram, 2016). In other words, some TBAC platforms are no longer new entrants introducing competition but established actors that are gaining market power and tend to dominate markets, making it more difficult for other platforms to compete and grow. Although antitrust agencies have so far overlooked or downplayed this issue, some scholars have been discussing it in recent years. These discussions will be the focus of the next subsection.

3.1.2 Competition between trust-based algorithmic coordination platforms

Richard: Right, but we can offset a lot of that once we get a few customers and start a subscription revenue model

Russ: What? Revenue? No, no, no, no, no. No revenue. I'll call you back. What? Why would you go after revenue?

Richard: Because... to make money.

*Russ: No. If you show revenue, people will ask "How much?" And it will never be enough. The company that was the 1x becomes the 2x dog. But if you have no revenue, you can say you're pre-revenue. You're a potential pure play. It's not about how much you earn, it's about what you're worth. And who's worth the most? Companies that lose money. Pinterest, Snapchat. No revenue. Amazon has lost money every f**ng quarter for the last 20 f**ng years and that Bezos motherf**er is the king.*

Richard: The king.

Russ: There's no revenue. No one wants to see revenue.

Richard: Oh, uh I just thought that mainly the goal of companies is to make money.

*Russ: Yeah, no, no, no. That's not how it works. I don't want to make a little bit of money every day. I want to make a f**k ton of money all at once.*

Silicon Valley, Season 2, Episode 3, “Big Money”

We shall now study competition and market power dynamics between TBAC platforms. Using the multisided markets theory (subsection 3.1.2.1) and our own characterization of TBAC firms as algorithmic coordinators of trust-based network interactions (subsection 3.1.2.2), we will show how, under current regulation, these features render competition between TBAC platform a winner-takes-all competition. Then we will proceed to illustrate this point with some empirical evidence about Uber’s road to dominance of the main ride-hailing markets in the United States (subsection 3.1.2.3).

3.1.2.1 The multisided markets roots of trust-based algorithmic coordination platforms’ winner-takes-all markets

As mentioned above, TBAC platforms are also, although not simply, multisided platforms¹⁰⁵. Therefore, it is worth to begin by analyzing competitive dynamics proper to multisided platforms that have already been discussed in the literature. The literature has identified four factors that lead to a winner-takes-all dynamics in multisided markets: strong direct network effects, strong indirect network effects, difficulty (or irrelevance) of differentiation between platforms and difficulty of multi-homing in at least one side of the market (Chen & Tse, 2008; Kouris & Kleer, 2012). We shall therefore begin by assessing each of them in the case of the TBAC firm.

Let us begin with network effects. In TBAC platforms direct network effects are not of much importance. Indeed, there is even rivalry between users of the same side of the market, sometimes in both sides of the market. An example of the former is the gig-work platform YoupiJoB, where workers compete to find clients, while clients do not compete between each other to find workers. An example of the latter is the carpooling platform BlaBlaCar, where the more riders there are for a certain route, the lower the chances a rider has to find a free spot are and, therefore, the higher the price he/she will pay will be. Symmetrically, the more drivers there are for a certain route, the lower the price the driver will be able to set. Independently of the existence of rivalry within a side of the market, the number of users in one side

¹⁰⁵ We will employ hereafter the term “multisided platform” to refer to *businesses* that are multisided, as the term “multisided market” is ambiguous: sometimes it is used to refer to these businesses and sometimes to refer to the markets in which they operate.

of the market rarely increases the utility of the platform for users of that side in TBAC platforms. On the contrary, given that one of the main features of TBAC platforms is to put in touch individuals from two sides of a market for them to engage in network transactions and/or production, indirect network effects play a major role. In TBAC platforms, the utility of the platform for a user of one side of the market always depends positively on the size of the other side of the market. If this effect is strong enough, it can create a tendency for users to converge to a single platform once it has reached a critical mass of users in at least one side of the market

Nevertheless, when differentiation between platforms participating in multisided markets is possible, the winner-takes all dynamic can be offset. In this sense, following Schepp and Wambach (2015), Sokol and Comerford (2016) argue that “online platforms are highly differentiated, even in the provision of the same type of service” and that “each entrant carves out a niche”. The problem with this assertion is that the term ‘online platform’ is too broad and not fit to analyze TBAC platforms as defined in the previous section. Indeed, when it comes to TBAC platforms, differentiation plays a smaller role in attracting users than in other types of online platforms. When discussing differentiation, the literature on multisided markets usually recurs to examples of multisided markets in which the originality/quality of the *content* provided by the firm or the identity of the platform are crucial for firms to gain a competitive advantage. This is the case of newspapers (a certain type of subjects covered, an editorial line, a writing style), social networks (a certain way of interacting online with other people) or night clubs (a certain aesthetic, a certain musical style). In the case of TBAC platforms, there is no original content and the identity of the platform is anecdotal. The key role of the platform is the provision of a service in which differentiation plays a small role because it is reduced in scope. For example, in the case of ride-hailing platforms, differentiation is reduced to mainly three variables: luxuriousness of the vehicle, available passenger seats on the vehicle and sharing or not sharing the ride with other passengers traveling along the same route. Consequently, it is hard to carve out a niche in ride-hailing platforms through differentiation because the possibilities of differentiation are limited.

Moreover, precisely because differentiation possibilities are limited, platforms practice within-platform differentiation to make sure they can reach each type of user and adapt to users with swinging needs by offering them differentiated versions of the same service. For example, the two main American ride-hailing apps, Uber and Lyft, offer a very similar bundle of services that differ between each other in terms of these three variables. Both Uber and Lyft have a baseline option that seats up to four passengers (Uberpop and Lyft), a minivan or SUV that seats up to six passengers (Uber XL and Lyft Plus), a cheaper option that pairs users with other passengers traveling along the same route (uberPool and Lyft Line), a luxury black service (Uber Black and Lyft Lux) and a luxury SUV or minivan service (Uber SUV and

Lyft Lux SUV). Similarly, Airbnb offers hosts different pricing and reservation criteria options. Hosts can set a fixed price per night or use an automatic pricing algorithm that takes into account supply and demand for similar accommodation in the area. Hosts and travelers can also choose to either having to send/receive a request to book/rent a house or to book/rent a house instantaneously without previous authorization of the host. Another example of within-platform differentiation is the gig-work platform TaskRabbit, where workers can opt to set a fixed hourly rate and apply to perform tasks in a future day or let the platform choose a variable hourly rate and have the possibility of doing tasks to be completed in the same day. **Then, limited mimetic within-platform differentiation across competing platforms makes of differentiation less of a competitive advantage to carve out a niche than in other multisided platforms: users can find more or less the same variants of the baseline product regardless of the ride-hailing platform chosen.**

Let us now analyze the possibility of multi-homing (participating in two or more competing platforms) in TBAC platforms. The main reason why multi-homing can be hindered in TBAC platforms is the existence of strong switching costs. The latter exist when users refrain from switching to a competing platform because of the (usually non-monetary) costs it implies. In TBAC platforms, switching costs can be divided in three categories: learning costs (learning how a platform works), bureaucracy-related costs (in the case of platforms that require doing paperwork such as background checks or proof of insurance to join them) and ‘reputational costs’ (the cost of losing the reputation that has been accumulated in another platform).

Learning and bureaucracy-related costs are negligible. Consumers using TBAC platforms are used to a dynamic market of applications and platforms and can adapt without much inconvenience to new platforms. In the ride-hailing market, which is probably one of the markets with higher bureaucracy-related costs for drivers (background checks, vehicle inspection, insurance, etc.), it is common for them to drive for both Uber and Lyft, as studies indicate (Choudary, Parker & Van Alystne, 2015). However, when it comes to reputation, switching costs can be higher. As shown above, reputation plays an important role for users in TBAC platforms. A solid digital reputation opens the door to network interactions with other users that may be harder or impossible to achieve with a low reputation score. In Uber, drivers whose rating goes below 4.6/5 are expelled from the platform. In Airbnb, hosts with bad reviews get less visibility of their listings, which makes it more difficult for them to rent their houses. Symmetrically, drivers with higher ratings are more likely to get more rides and hosts with higher ratings are more likely to get more reservations and/or set a higher price as a result of the higher quality of their hosting other users have signaled. It is important to point out that reputational costs increase over time

because, the longer users have been using a platform, the more solid their reputation score is: a five stars score based on a hundred reviews signals better the quality of the service offered by a user than a five stars score based on just one review. Therefore, the more experience users collect in a platform, the higher the cost of losing their reputation becomes. Switching costs, and the subsequent difficulty of multi-homing, are the consequence of users not enjoying data portability (Van Gorp & Honnefelder, 2015). Then, it follows that “switching costs would be reduced further if consumers were assured data portability between platforms” (Perzanowski & Schultz, 2010). It follows the lack of data portability, in turn, limits competition (Autoritat Catalana de la Competència, 2016).

3.1.2.2 User feedback loop in the a multisided market with positive indirect network effects: a trust-based algorithmic coordination platforms-specific barriers to entry

Given that the core capability of a TBAC firm depends to a large extent on algorithmic coordination that relies on user activity data, it follows (as explained above when dealing with dynamic efficiency in TBAC firms) that large sets of user activity data are the main source of efficiency gains and quality improvement of the service the firm provides. In this context, the “user feedback loop” (Graef, 2015) or “data snowball effect”, as the French and German antitrust agencies call it (Autorité de la Concurrence & Bundeskartellamt, 2016) constitutes a major mechanism that pushes markets in which TBAC firms participate towards being winner-takes-all markets.

This effect consists in the fact that the more users a platform has, the more attractive it becomes for users, although not because of network effects *per se* but because of a “user feedback loop” where “as a platform gains more users, it can collect more user data, leading to better insights into consumers and their needs, which can be used to improve quality, attracting even more users” (Sokol & Comerford, 2016). The reason for this link between user activity data and the quality of the service has to do with technical properties of the use of big data. Algorithms not only need large amounts of data to function, they also need it to improve. Once an algorithm (or, more generally, a model) is correctly designed to fit its data (once the right questions are asked in the proper way)¹⁰⁶, the more data that an algorithm can work on, the more likely it will be that it will improve over time. Once the team of developers is performant enough, the ‘algorithm race’ becomes a matter of who has more data. As the famous quote by Google’s

¹⁰⁶ For a more detailed explanation of under which conditions does more data improve a model, see Amatriain, X. (2015), “Machine Learning, What is Better: More Data or better Algorithms.” Available at <http://www.kdnuggets.com/2015/06/machine-learning-more-data-better-algorithms.html>

Chief Scientist Peter Norvig goes, “we don’t have better algorithms than anyone else; we just have more data”. Therefore, “the acquisition of large volumes of data by ‘first mover’ providers may, however, raise barriers to entry and thus deprive users from the benefits of competition” (Geradin & Kuschewsky, 2013).

On the same line, a report on taxation of the digital economy commanded by the French government points out that “all digital economy firms use data to improve their supply, obtain productivity gains, diversify their activities or reinforce their position on the different faces of the business model”¹⁰⁷ (Collin and Collin, 2013). Moreover, the literature stresses the importance of offering a high quality service rather than being the first mover for a firm to enjoy the benefits of network effects in multisided markets (Iansiti & Zhu, 2007; Liebowitz, 2002; Rangan & Adner, 2001).

Taking into account the operation of the user feedback loop effect in multisided markets characterized by the existence of positive indirect network effects, we can expect the existence of a tipping point where a TBAC platform would have so much more data on user activity than its competitors for the latter to be unable to compete in quality with the former. In Kestenbaum words, “if the information necessary to compete on equal footing is not readily available from alternative sources, the potential competitive harm from data-driven entry barriers raises a cognizable theory of competitive harm under the antitrust laws” (Kimmel & Kestenbaum, 2014). In that sense, as the OECD has observed (OECD, 2015b) echoing Tim O’Reilly’s words (Bruner, 2013.), “where companies acquiring massive proprietary data sets there is thus a higher risk that we’re kind of heading toward data as a source of monopoly power”. As Geradin and Kuschewsky (2013) have suggested, this opens the way to the use of the essential facility doctrine to examine this market power building mechanism, although its applicability under article 102 of the TFEU might not be easy. In the case of TBAC firms, the essential facility would not be data itself but a *large enough* amount of user activity data in respect to competitors’.

Following this logic, we should expect the winner of these winner-takes-all markets to uphold a dominant position. Indeed, once the above-mentioned tipping point would be reached, it would be hard for potential competitors to challenge the winner’s position by offering a service of similar or higher quality because of the large asymmetry in the ownership of the necessary data that would play in favor of the winner. In addition, these mechanisms reinforce over time: the more users a platform has and the longer they have been using the platform, the stronger the user feedback loop becomes and the larger the amount of user activity data needed to contest the market becomes. Moreover, as said before, reputation costs could also become a barrier to entry which size would increase over time: the more time a platform remains the winner, the more experience its users collect, and, therefore, the higher the cost of losing their reputation

¹⁰⁷ The translation is ours

becomes. **Nevertheless, this does not mean that the winner would be uncontestable, although incumbent platforms would find it difficult to do so for the reasons we have given above. It rather means that we should expect that the result of competitive dynamics between TBAC firms would be market structures in which a dominant player will have most of the market.**

Nevertheless, not all scholars agree with the idea that the user feedback loop, coupled with positive indirect network effects, can create winner-takes-all dynamics in markets in which TBAC firms compete¹⁰⁸. In the following lines, we will present these arguments and some counter-arguments. As we will show, because the former have been formulated to apply to any digital platform participating in multisided markets, they are rarely pertinent when assessed in the context of TBAC platforms.

First, it has been argued that in multisided platforms it is not the number of users on each side that counts the most, but rather the quality of the match between users of each side because “most customers on most platforms are not very good matches for each other” (Evans & Schmalensee, 2017). Nevertheless, this is hardly the case in TBAC platforms. In ride-hailing platforms, a good match is essentially a nearby rider/driver, as “waiting time is an essential feature of the quality of ride hailing platforms” (Herrera Anchustegui & Nowag, 2017). Then, the more riders/drivers there are on the platform in a given territory, the more likely it will be for a nearby driver/rider to demand/offer a ride. In lodging platforms, although users’ requirements are more specific (e.g. visitors might want to stay in a certain neighborhood and not pass a certain budget, while hosts might prefer hosting couples of non-smokers), the more hosts there are, the more likely it will be for visitors to find a good match, and vice versa. For this reason, users use TBAC platforms that have the most users. Moreover, the probability of a good match happening depends also on the performance of the matching algorithm. In ride-hailing platforms, the algorithm predicts which areas will see a rise in demand and, accordingly, ‘directs’ drivers there by increasing the price of rides in the area and/or by providing benefits (e.g. bonuses or granting more rides) to drivers that go there, as the above-mentioned case about Uber’s use of the software Hell shows. In order to do a proper prediction, ride-hailing apps recur to *past* data on how drivers and riders have interacted in the platform (McLean, 2016). In Airbnb, algorithms predict supply and demand for different types of accommodations depending on the time of the year. Using that information, which builds on past data about users’ interaction within the platform, they customize the options they display to visitors and suggest prices to hosts in order to maximize the number of “good matches” (and the revenue of the platform). Therefore,

¹⁰⁸ We will follow Sokol & Comerford’s (2016) and Evans & Schmalensee’s (2017) papers since they cover vastly the criticisms that have been made in the literature against winner-takes-all dynamics in multisided markets.

the accumulation of large amounts of data by one firm can lead it to secure a competitive advantage that can only increase over time as the data snowball effect keeps operating.

Second, following Tucker and Wellford (2014) and Lerner (2014), Sokol and Comerford argue that “online providers can gain scale in users in ways that do not involve user data, and that access to data alone is not enough to improve quality and gain scale in users. Additionally, firms can gather data from other sources than users (e.g. data brokers), and can gain scale in data in alternative ways, such as entering into strategic distribution arrangements” (Sokol & Comerford, 2016). The problem with the first argument is that in TBAC platforms’ quality depends much more on access to large datasets on user activity than in other online platforms. As said before, contrary to what happens in other digital platforms, differentiation plays a smaller role and takes place within platforms to a large extent, while the service they offer does not have any original content aspect. Then, the quality of the product depends highly on the performance of algorithms, which in turn relies on the availability of large datasets on user activity that allows their improvement. The second argument is currently difficult to hold in the case of TBAC platforms. To our knowledge, there are no data brokers that could sell relevant data to new TBAC entrants. Moreover, we have to be careful on what data we are talking about. The most relevant data for a new TBAC entrant is observed data on how users interact within competing incumbent platforms. Contrary to non-TBAC data-driven businesses such as search engines, the data collected by TBAC platforms about their users’ activity cannot be obtained without the platforms’ consent. For data brokers to have access to it (which, to our knowledge, is not the case for TBAC platforms), they would need to buy it from TBAC platforms. It is difficult to imagine why an incumbent TBAC platform would sell that valuable data to a data broker that could in turn make a profit by selling it to competing TBAC platforms. Nevertheless, some ways to obtain (partial) data user activity exist. For example, it has been recently revealed that the company Unroll.me, which offers a simple unsubscribing service from mailing lists to users, has used the access users give it to their emails to collect data on the Lyft bills they get through email and sell it to Uber, its main competitor (The Hustle, 2017). Although these indirect and alternative ways of obtaining user experience data may exist, it has to be kept in mind that they are rare and partial.

A third similar argument offered by Sokol and Comerford (2016) is that “data is ubiquitous, inexpensive, and easy to collect” (C. Tucker, 2012) because “customers leave multiple digital footprints on the internet (Lambrecht & Tucker, 2015)”. While this is true for data in general, as we said before, it is seldom the case for the specific data a new firm would need to challenge TBAC incumbents. The digital footprints that are useful to new entrants are mostly located in proprietary databases owned by incumbents. If, for example, a platform cooperative like Juno wanted to capture a significant market share from Uber and

Lyft in the United States, it would need large amounts of data of users' trips in those platforms, not any data.

The fourth argument is that data is non-exclusive and non-rivalrous. In other words, "collection of a piece of data by one firm does not occur at the expense of another firm" (Sokol & Comerford, 2016). This claim confuses the technical properties of data with the legal rights applied to it, while in fact economic properties of data are the combined result of the two. Data being non-exclusive and non-rivalrous depends on what data we are talking about. It is true in the case of personal information, for example. A person can provide information about his/her birthplace to two competing platforms. But it is not true for most of the relevant data new entrants would need to compete in the sharing economy. Following our previous example, if Uber has information about a certain amount of trips users did using its application, Juno will never be able to collect that same data to improve its algorithms because Uber's exclusive intellectual property rights over the database that contains that data and/or its right to use trade secret to keep the data away from competitors gives it a legal right to exclude Juno from its use. In other words, intellectual property and trade secrecy can create rivalrousness where technical conditions do not.

The fifth argument is that "data has a limited lifespan – old data is not nearly as valuable as new data – and the value of data lessens considerably over time" (Sokol & Comerford, 2016). This assertion is taken from Chiou and Tucker's paper (2014), which investigate search engines. There is no reason to consider it is also the case of TBAC platforms. On the contrary, as said before, it is precisely *past* data that allows algorithms to perform an effective matchmaking in TBAC platforms.

The sixth argument is that "the possession of data alone therefore, even in large volume, does not secure competitive success – that can only be achieved through engineering talent, quality of service, speed of innovation, and attention to consumer needs" (Sokol & Comerford, 2016). Similarly, Evans and Schmalensee (2017) argue that multisided platforms "have to figure out how to get all sides on board in order to create any value at all". This is certainly true, but it does not imply that the lack of large amounts of data can be a barrier to entry for newcomers in markets in which TBAC platforms participate. New entrants can effectively overcome this barrier by offering a very good service, but that does not mean the barrier does not exist. Moreover, it should be pointed out that this argument, backed in Evans and Schmalensee's (2017) article by the example of the case of Youtube, has a lesser weight in the case of TBAC platforms than in content-based platforms or social media platforms. While some platforms effectively rely a lot on the distinctive features of the platforms to engage users to participate, the decision to choose a particular TBAC platform depends mainly on variables that leave little room for differentiation (e.g. short waiting times, small prices, having many offerings to choose from, etc.). These

variables, in turn, depend largely, for users from each side of the market, on the number of users on the other side of the market, and the resulting matchmaking-improving data having many users on both sides of the platforms generates.

Finally, Evans & Schmalensee (2017) argue that indirect network effects are a double-edged sword because they can work in reverse. The argument is that, since switching costs are low, once a better platform comes into the market, users start multi-homing and eventually drop the first (dominant) platform to join the new one, which leads to an exponential decline (inverse network effects) in the number of users of the first platform. The authors recall the examples of social networks (AOL, Friendster, MySpace, Orkut and Yahoo), mobile providers (Blackberry and Microsoft), search engines (AltaVista, Infoseek and Lycros) and browsers (Microsoft) that suffered from reverse network effects to back their argument. Although, as said above, we agree on the fact that switching costs are rather small in TBAC platforms and multi-homing is easy, we believe this argument does not hold properly in the case of TBAC platforms. As said above, contrary to social networks, mobile providers, search engines and browsers, product differentiation plays a small role in TBAC platforms and it even takes place within platforms that have the largest users base. Consequently, the attractiveness of a new TBAC platform relies vastly on its capacity to offer to both sides of the market a service which quality depends on variables that leave little room for differentiation (e.g. short waiting times, small prices, having many offerings to choose from, etc.) and that, in turn, rely heavily on having a large user's base.

In a nutshell, the problem with the arguments exposed above is that they refer to the platform economy in general. While they may apply to some types of online platforms, they are rarely pertinent when it comes to TBAC platforms because the latter present particularities that we have pointed out in Section 2. This shows why it is important to analyze the competitive dynamics of each type of platform of the platform economy separately as we decided to do by focusing on TBAC platforms.

We conclude that there are mechanisms through which competition dynamics between TBAC firms tend to create winner-takes-all markets in which the winner would hold a dominant position. This is due to the combination of several features proper to the TBAC firm and its regulatory environment: the small role played by differentiation, the prevalence of (mimetic) within-platform differentiation and the existence of particularly strong and positive indirect network effects that, coupled with a 'user feedback loop', can make large enough amounts of data on user activity become an essential facility.

3.1.2.3 Some evidence of winner-takes-all dynamics in trust-based algorithmic-coordination platforms' markets: the case of Uber in the main U.S. ride-hailing markets

We have argued in the previous section that TBAC platforms' markets are winner-takes-all markets. In this section we will provide some (rough) evidence that supports this claim using the example of Uber, a platform that seems to be conquering the main ride-hailing markets of the United States. The choice of this case responds to three criteria. First there is the availability of data. The data required to rigorously analyze the existence of a winner-takes-all dynamic in any market where TBAC platforms compete is currently scarce and incomplete. Nevertheless, in the case of Uber and its competitors, some scattered sources of data that will help us in this endeavor are available. Although imperfect, the available evidence will offer some interesting insights. The second criteria is that transportation is one of the sectors in which TBAC platforms have expanded the most and, therefore, a sector in which the winner-takes-all dynamics described above are more likely to be manifesting already. Finally, the United States is a country in which competition between two TBAC platforms, Uber and Lyft, is particularly strong, so the choice of this country represents a hard test of our theoretical findings.

In order to build our argument, we will begin by defining the relevant market of ride-hailing platforms. Then we will compare the existent data on market shares in American ride-hailing markets to show that, as expected in winner-takes-all markets, the market shares of a single firm (Uber) have been increasing to the detriment of that of its competitors'. Finally, we will show that Uber's strategy to conquer these markets seems to be based on a predatory pricing strategy that can only be rational if ride-hailing markets are winner-takes-all markets.

Market definition and market shares

We will begin by analyzing the evolution of market shares. If, as we claim, ride-hailing markets are becoming winner-takes-all markets that Uber is conquering, we should observe an increasing gap over time between Uber's market share and its competitors' in favor of the former. In order to do so, we need to define first the relevant market in which Uber participates.

The definition of the relevant market is particularly difficult when it comes to multisided platforms. Traditional approaches based on defining the products that are part of the relevant market and those that are not "are particularly likely to obscure market realities" in the case of multisided platforms (Evans and Noel, 2005), since competition does not take place in a single-sided market over a product or a range of products. Because the aim of defining a relevant market is to understand the factors that constraint business behavior and to assess the contours of competition of a firm, a more fruitful approach for ride-hailing platforms (and for multisided platforms in general) consist in identifying sources of competition constraints (Evans and Noel, 2005). Based on the analysis of Uber's business model made in the recent

“Uber Spain Opinion”¹⁰⁹, Dunne (2018) argues that Uber’s market is the underlying services market (the ride-hailing service market) rather than a niche intermediation market. This is a geographically defined market that can be circumscribed to a territory. In this geographically defined market, and consistently with the finding of the literature on market definition in multisided platforms, firms compete to attract users on both sides of the market (Evans and Noels, 2005; Dune, 2018). On the riders’ side, two types of Uber competitors can be identified: other ride-hailing platforms (the main and only national one in the United States being Lyft) and other non-platform-based ride-hailing services, out of which the most relevant ones are taxis. On the drivers’ side of the market, given that the number of taxi licenses is limited by regulators and their price is too onerous for the vast majority of Uber and Lyft drivers¹¹⁰, taxis are not to be considered as relevant competitors. In other words, ride-hailing platforms do not compete with taxis for drivers because ride-hailing apps’ drivers can very rarely become taxi drivers, and taxi drivers can only lose income by becoming ride-hailing drivers.

Having defined Uber’s relevant market, we should begin by studying the evolution of its market shares in these markets. Two observations need to be made in this respect before starting studying Uber’s market shares. First, because, as said above, Uber competes over users on both sides of the platforms (drivers and riders), ideally, the measurement of market shares should be done on both sides: the share of rides and the share of full-time equivalent drivers of each competitor. Unfortunately, there is no such available data on drivers. Therefore, we will have to limit our analysis to measurements of market shares that only consider the riders’ side of the market. Nevertheless, *ceteris paribus*, unless mean waiting time increases considerably, because of the existence of indirect network effects, an increase in a firm’s riders’ market share will translate into an increase in its drivers’ market share. Otherwise, average waiting time would increase because of an excess of demand for rides, which would in turn reduce riders’ market shares as passengers shift to competitors with lower mean waiting times. Then, although we will not be able to measure drivers’ market shares, we can make conclusions about their dynamics (and not their magnitudes) by looking at how the riders’ market shares evolve. This is not very problematic as what we need to corroborate is if there is a widening gap between Uber’s and its competitors’ market shares over time. Second, although calculations of Uber’s market shares on the riders’ side of the market exist, they generally define the market narrowly, as most of them consider either Lyft or taxis as the other market

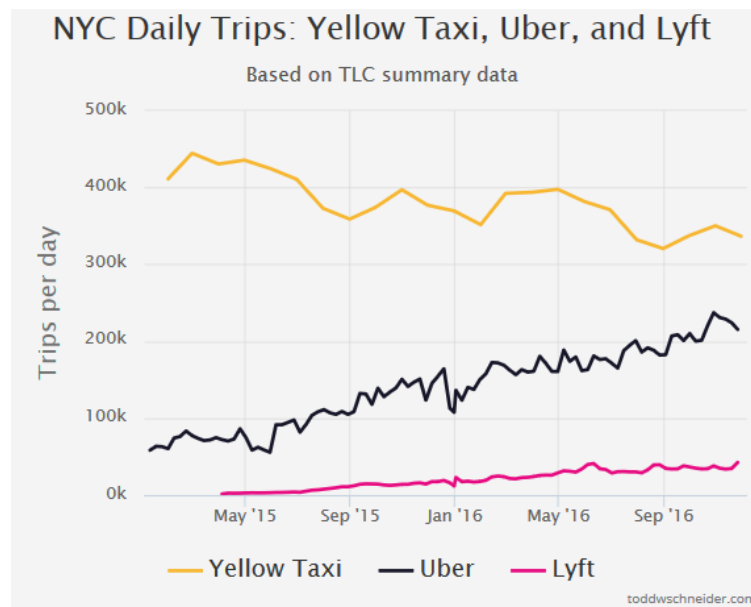
¹⁰⁹ Opinion in C-434/15 *Asociación Profesional Elite Taxi* (‘Uber Spain Opinion’) EU:C:2017:364

¹¹⁰ A recent study by the MIT (Zoepf et al, 2018) shows that, in the United States, 74% of Uber and Lyft drivers earn less than the minimum wage in their state.

participant and not the two, while some measurements include both of them. Given that data sources are scarce, we will recur to all of these sources and, conscious of their shortcomings, compare them to corroborate our theoretical findings of this section.

When we look at the existing evidence on Uber’s market share properly calculated (i.e. when both taxis and Lyft are taken as market participants), they all show that Uber is on its way to dominating the market. By combining different data sources on 1.1 billion trips in New York, and taking Uber, Lyft, Green Taxi and Yellow Taxi as market participants, Schneider (2016a) finds that between May 2015 and September 2016¹¹¹ Uber has steadily increased its market share measured in number of trips much more rapidly than Lyft and to the detriment of Yellow Taxi’s. It follows from this tendency shown in Figure 22 that Uber is on its way to dominating the New York City market, including every borough (Brooklyn, Queens, Manhattan, Bronx and Staten Island) and airport trips.

Figure 21: New York monthly pickups –May 2015 and September 2016



Source: Schneider (2016b)

The same tendency is verified when the analysis is narrowed down to each borough (Schneider, 2016b) and airports: Uber’s market shares grow exponentially, Lyft’s grow at a decelerating pace and taxis’ fall.

¹¹¹ This timeframe, like all the other timeframes used to calculate the other market shares that will be presented in this subsection, are not the most pertinent to draw conclusions by any means. Lacking additional sources of data to calculate market shares, we have no option but to take these numbers knowing they present limitations.

This tendency is corroborated by analyses that, by recurring to a narrower market definition that includes Uber and taxis but not Lyft as market participants, also conclude that Uber is gaining market shares to the detriment of taxis. Using data provided by the New York City Taxi and Limousine Commission, Fischer-Baum & Bialik (2015) estimate that between 2014 and 2015 Uber's share of pickups has increased by 12 percentage points for the April-June period in New York City counting all the boroughs. The same tendency is observed by Certify (2015) for business travelers in all main cities of the United States during the first quarter of 2015. Nelson (2016), in turn, finds that since Uber and Lyft started operating in Los Angeles, trips taken in taxis have declined by 30% over three years (2012 to 2015). Similarly, "in San Francisco, the corporate home of both Uber and Lyft, the number of trips taken per taxi dropped by more than two-thirds over a two-year period" (Nelson, 2016).

Finally, calculations that define the market by only taking into consideration Uber and Lyft as market participants show that Uber is taking an increasing share of the trips taxis are losing to ride-hailing apps. A report from 7Park that compares the market shares of these two platforms by revenue shows that Uber's market share was considerably larger in the twenty main U.S. cities in the second quarter of 2016. During that period, its market share varied from 62% to 83% depending on the city (7Park, 2016). This is in line with the (optimistic) claim Uber made to its investors in August 2016 according to which its market share (which includes only other ride-hailing apps as market participants) in the U.S. was between 84% and 87% (Bloomberg Technology, 2016). If we turn now to the evolution of the gap between Uber and Lyft's market shares, we corroborate what is expected in a winner-takes-all market: it widens over time in favor of the winner (Uber). Using anonymized credit and debit card spending data of a sample of 3.8 millions of users, a report by FutureAdvisor shows that, between June 2013 and September 2014 Uber's revenue has increased 10 to 11 times faster than Lyft's in absolute terms. For the same period, Uber has increased its number of rides 6 to 7 times faster than Lyft in absolute terms (FutureAdvisor, 2014). Moreover, during that period 82,000 people used Uber, while only 14,200 people (5.8 times less) used Lyft.

We can conclude that the available figures on ride-hailing market shares in the main United States markets, although certainly imperfect and incomplete, point out in the same direction: Uber is increasing its market share to the detriment of both taxis' and Lyft's. These market shares, although not large enough to raise suspicions of dominance neither by European (above 40% of the market) or US antitrust (65% market share being "doubtful") standards (Dunne, 2018) when both taxis and Lyft are taken as market participants, are evolving in favor of Uber and to the detriment of its competitors, as expected in winner-

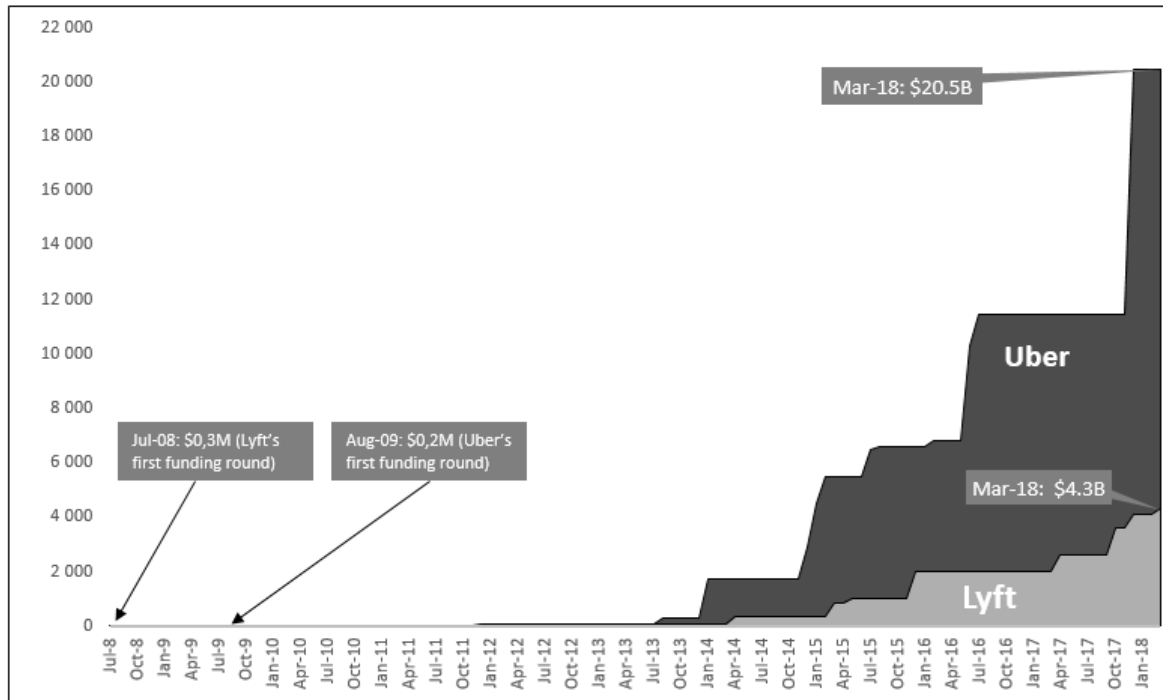
takes-all markets. Nevertheless, it should be noted that even if these market shares were large, there would not necessarily be indicative of market power. Market shares provide an indication that may be disproved by other factors. In this sense, it is pertinent to analyze other indications that back our theoretical findings according to which there is a risk of Uber gaining market power in the future when it becomes the winner of a winner-takes-all market. In this sense, in the next subsection we will study Uber's behavior in these markets to argue that the increase in its market shares is the result of a predatory pricing strategy that can only be rational if ride-hailing markets are winner-takes-all markets in which, once Uber becomes the winner, it will gain market power, which will allow it to recover the losses induced by predation.

Signs of Uber's predatory pricing strategy aimed at securing a winner-takes-all ride-hailing market

We have seen so far that Uber's market shares are increasing exponentially to the detriment of Lyft's and taxis'. What strategy is it employing to get there? On the riders' side of the market, Uber has expanded by systematically cutting fares in more and more cities every January for three years in a row since 2014. In that year, it did so in 16 of its 24 US cities. In 2015 it cut fares in 48 cities and in 2016 in 100 cities. While this boosts demand, it decreases the size of the drivers' side of the market, since drivers earn money by getting a cut of the fare charged to riders. Moreover, Uber has been increasing the commission it takes from drivers, lowering so drivers' revenue per trip. Until 2014, Uber's commission was 20%. It then rose to 25% and it is as high as 30% in some cities. In addition, Uber started charging flat fees to drivers in 2014, the amount of which began at 1 dollar and is now as high as 2.5 dollars in some cities (Bloomberg Technology, 2016). To avoid losing drivers, Uber has started offering them bonuses, incentive programs and earning guarantees. It is worth noting that the conditions that drivers need to meet to be eligible for earning guarantees make it almost impossible for drivers to work for other platforms at the same time (i.e. to practice multi-homing). In other words, Uber has been systematically subsidizing *both* sides of the market.

As a result of this strategy, Uber has been reporting losses since its foundation in 2009. In 2015 it lost 2 billion dollars and in the first half of 2016 it lost 1.27 billion dollars. Uber's head of finance, Gautman Gupta, claimed that subsidies to drivers explain the majority of the company's losses (Bloomberg Technology, 2016). Nevertheless, Uber has increasingly been able to raise large amounts of funds.

Figure 22: Uber’s vs Lyft’s cumulated funding (in million US dollars)



Source: own elaboration based on www.crunchbase.com

As Figure 23 shows¹¹², Uber raised 3,700 million dollars in 2015 (equivalent to 185% of the losses of that year) and 4,850 million dollars in 2016 (equivalent to 328% of its *mid-year* losses). In its last round of funding in August 2016, Uber’s valuation was set at 69 billion dollars, a number that seems astronomical (roughly 35 times the value of Uber’s yearly losses of the past 2 years!) considering the company has been making losses for 9 years in a row since its foundation.

These trends indicate that Uber, which has no other source of revenue but the commission it takes on each trip, is engaging in predatory pricing to conquer a winner-takes-all market. Indeed, in the case of multisided platforms, predatory pricing takes place when a firm makes losses over the whole platform (Evans & Schmalensee, 2005), and not over the most elastic side of the market, since multisided platforms’ pricing schemes are characterized by one side subsidizing the other one. This is the case with Uber, which systematically cuts fares (riders’ side of the market) and gives bonuses, incentive programs an earning guarantees to drivers (drivers’ side of the market) and, as a result, has been making losses over

¹¹² The numbers shown in Figure 23 do not include the funding rounds with undisclosed figures of money raised that took place in the following periods. For Uber: December 2011, February 2015, April 2017 and January 2018. For Lyft: April 2014, October 2016 and December 2017.

the whole platform for 9 years. This strategy echoes traditional predatory pricing models based on financial constraints in which, as long as a firm can secure more financial resources than its rivals to sustain a price war long enough, it will be rational for it to practice predation (Roberts, 1985). As Figure 23 shows, Uber benefits from considerable financial asymmetries in respect to Lyft: being a year younger, Uber has been able to secure about four times more funds than its local American rival Lyft. Moreover, Uber's last valuation has been estimated at 70 billion dollars, while Lyft's has been estimated at 11 billion dollars¹¹³. Far from being a United States phenomenon, predatory pricing strategies take place in other countries' ride-hailing markets. In Asian markets, Uber left the market after losing a price war with Grab (South East Asia), on the one side, and Didi (China), on the other side. In both cases, as stated recently by Raphaël Morel, Uber's Head of City Development in France¹¹⁴, Uber left these markets because it did not have as many financial resources as its competitors to survive the price war.

The only possible explanation for this strategy is that, consistently with our analysis in this section, investors are providing enough funds for Uber to be the winner of a winner-takes-all market in which it will eventually be able to make up for the losses of the previous years by exerting market power. Given that entry costs are low in the ride-hailing market (they come down to basically the developing an app and marketing campaigns), Uber's predation strategy can only be rational if the market, as we argued in this section, is a winner-takes-all one. In this case, Uber would be able to recover from the cost of predation in two combinable ways. First, once it dominates a market, it can raise prices, just like the Chinese ride-hailing app Didi did once it won a price war to Uber in China (Beijing Review, 2016). Second, it can use its dominance over ride-hailing markets to conquer other markets. This could happen by using the data in markets where competition takes place through innovation, as it is currently doing by using ride-hailing data to develop artificial intelligence that will allow it to enter the autonomous vehicle market. It could also happen by following a business group structure similar to that of the Chinese net giants Tencent, Alibaba and Baidu, in which "the different platforms can both feed one another and be leveraged to expand into other business areas" (Jia & Kenney, 2016) by cross-feeding traffic to another platform (e.g. the food delivery platform Uber Eats) and using cross-platform personal data to customize offers to users. In any case, if a new entrant tries to contest the market once Uber wins it, the latter, relying on its market dominance to attract even more investors than today, and knowing that differentiation is not a strategy that pays-off in ride-hailing markets, could trigger a price war and leverage on the financial and data

¹¹³ Last valuations available on May 13th 2018.

¹¹⁴ Statement made during the conference « Plateformes et territoires » organized by the Cities and Digital Technology Chair of Sciences Po on May 3rd 2018 in Paris.

asymmetries (the latter improving its matchmaking algorithm, as shown above) that would play in its favor to remain dominant.

These findings lead us to encourage industrial economists to further study the particularities of TBAC platforms so that regulators and competition authorities can avoid the abuse of market power by dominant platforms in the future. As shown at the beginning of Section 3, competition authorities are focusing on competition issues related to TBAC firms that are related to asymmetries in regulation in respect to traditional firms, while they are downplaying or avoiding treating the issue of the constitution of winner-takes-all markets. Moreover, as we have shown in the case of Uber, these markets are in some cases being conquered by TBAC platforms that recur to predatory pricing, which should be as much as a concern as regulatory asymmetries when it comes to guaranteeing competition on equal footing in markets in which TBAC firms participate.

Conclusions

In this chapter, we have focused on the competitive and market power dynamics of a particular new type of firm that, just like the network-firm we studied in Chapter III, was born out of the ICT revolution: the TBAC firm. We started our analysis by situating TBAC platforms in the broader context of the platform economy. We explained how the latter was enabled by the ICT technological revolution that started in the 1970s and reached a critical maturity in the 2000s. By that decade, the conjunction of widespread internet, the maturity of the microprocessors revolution that made PCs and smartphones pervasive and cloud computing allowed for the creation of an array of business models based on platforms that collect data and treat it with algorithms to provide services. By recalling the cases of Amazon and Google, we illustrated the different roles data can play in platform firms' business models. Moreover, we signaled the difference between the sharing economy, in which horizontal coordination between peers takes place within the platform, and platform capitalism, which is characterized by for-profit platforms.

Having set the context of the emergence of the platform economy, we moved on to analyzing a particular type of platform-firm: the TBAC firm. We first reviewed its history and showed how TBAC platforms started as novel sharing economy organizations before platform capitalism took over them and eventually led to the birth of a new minority sharing economy trend within TBAC platforms: platform cooperativism. Then, based on a competence-based theory of the firm, we proposed a novel characterization of TBAC firms as algorithmic coordinators of trust-based network interactions, a characterization that, in our view, overcomes the problems of current definitions of the type of firms the TBAC economy includes. Building on this characterization, we showed that algorithmic coordination is a source of both static and dynamic efficiency that, along with a current regulation that, although heterogenic across countries and even cities, tends to benefit TBAC firms over traditional firms, accounts for a large part of the competitive advantage of TBAC firms over traditional firms that act as incumbents in their respective markets. Moreover, we showed how the movement from non-TBAC firms to TBAC firms resonates with that from vertically integrated firms to an industrial organizational landscape dominated by network-firms (cf. Chapters I and III) in that, by recurring to a fallback to (overall more efficient) firms' core competences, strong horizontal competition is amalgamated with vertical market power. Then we proceeded to analyze competition between TBAC platforms and we have argued that, given the algorithmic coordination nature of the TBAC firm and current regulation on data ownership, there is a tendency towards winner-takes-all markets in the TBAC economy, a claim we have empirically supported by studying the case of Uber in the main United States ride-hailing markets.

Conclusions of Part II

Part II has been dedicated to offering contributions to make strong price competition and long-run profit rate differentials theoretically compatible. We focused on two organizational objects that are of special relevance today and in which the coexistence of these two stylized facts can be identified: global value chains and trust-based algorithmic coordination platforms, a subset of platform capitalism.

Chapter III picked up the torch of the previous two chapters by offering a contribution to a competition theory of the internationally-dispersed network-firm or ‘global value chain’ in which strong price competition between network-firms is compatible with some firms exerting fully vertical market power within the network-firm and, as a result, obtaining bigger profits in the long-run. We have shown how uneven interdependence, which arises from firms’ capabilities being dispersed along the vertically-disintegrated global value chains that started becoming the norm in the 1990s, is the foundation of this form of market power that is not limited to the immediate tiers of the supply chain. It is precisely because strong network-firm vs network-firm competition forces firms to cooperate to produce at the lowest possible price a final product that some firms that are more essential to the overall production process of the network-firm are able to capture more value than others through the exertion of positional market power, obtaining higher profit rates as a consequence. Moreover, we have shown that the fact that firms have been increasingly focusing on their core competences since the 1980s is in part a long-run strategy aimed at maximizing this positional market power by increasing their centrality in the network-firms they belong to. Such a strategy, in turn, would not have been possible without all the (international) institutional transformations identified in Chapter I that occurred in parallel.

In **Chapter IV** we further illustrated how, by the mid-2000s, this competitive dynamic characterized by some firms exerting vertical market power in a strong price competition scenario has started to appear in a new type of firm within the emergent platform capitalism, the trust-based algorithmic coordination (TBAC) firm. Relying on an evolutionary theory of the firm, we have shown that the distinctive trait of firms such as the ride-hailing platform Uber or the lodging platform Airbnb lies on the fact that the routines that form a large part of their core competences consist in coordinating through algorithms exchanges between legally independent firms or individuals and providing trust-creating mechanisms without which these exchanges could not take place. Using the case of Uber as an illustration, we showed that, just as in the network-firm, the TBAC firm conjugates vertical market power (TBAC firms being able to obtain increasingly higher shares of the value created with other members of the network, e.g. drivers) with strong price competition (e.g. Uber constantly cutting prices to leave its competitors out of

the market) in a competitive dynamic in which there is a tendency towards winner-takes-all markets. Here again, vertical positional market power coexists with strong price competition and, moreover, market power serves to articulate a production process in which each coalition of agents, be it a network-firm or the producers of different TBAC firms' platforms and the companies owning them, compete strongly on price.

The results of Part II show that market power and competition can establish a synergic relationship today. Moreover, the fact that we could account for this relationship in two very distinct organizational objects that have emerged during the current form of competition identified in Chapter I (Finance-led competition) suggests that there have been recent historical developments both in institutions and in technology that have transformed the nature of the link between competition and market power in some organizational fields. We will develop this reflection in the general conclusions.

General conclusions

This thesis has been devoted to understanding possible articulations between competition and market power that differ from the traditional opposition between these two concepts on which all competition theories are built. Noticing the seemingly incompatible coexistence of long-run profit rate differentials between firms, a strong sign of market power, and fierce international price competition is what has triggered this investigation. Proposing a theoretical conciliation of the two in which competition and market power may establish a symbiotic relation has been the main goal of this thesis.

In doing so, we have examined competition theories (Chapter II) and American economic history (Chapter I), as well as two distinct organizational objects emblematic of contemporary competitive dynamics: global value chains (Chapter III) and trust-based algorithmic coordination firms (Chapter IV). As we have already developed in length the conclusions of all of these separate examinations in each chapter respectively, we will devote the general conclusions to exposing the main original contributions we have offered in this thesis that constitute answers to our general problem. After doing so, we will present the limitations of our work and the future lines of research that we believe follow from the findings and the limitations of this thesis.

Main original findings

Changes in institutions, technology and the nature of the firm not only affect the degree of market power; they also transform the nature of its link with competition

When we reviewed the exiting competition theories in Chapter II, we were able to appreciate how they evolved through time to account for historical transformations in the relevance of competition and market power and their mechanisms. For example, Imperfect Competition Theory is to a large extent a product of the rise of market power in the United States and England during the period we have described in Chapter I as ‘Constricted competition’ (circa 1920s to 1945) for the American case. Nevertheless, as history goes on, competition theory evolves by building theoretical architectures that seem to account for a certain period and, when times change, other (often contradictory and incompatible) competition theory is born to explain the new scenario. Each of these competition theories implies a certain link between competition and market power. While in all of them the two are opposed (i.e. market power is exerted if and only if

competition is hindered), the conditions under which market power can be obtained and exerted, the nature and the definition of competition and the conditions under which competition may lead to market power obtainment and exertion, vary from theory to theory. **Nevertheless, each theory poses the link between competition and market power as an immutable one: regardless of the theory taken into consideration, competition theory would argue that if the balance between competition and market power varies it is because the conditions under which this link takes place (barriers to entry, information asymmetries, etc.) change over time and space and across industries, making the degree of market power evolve. In every case, the important roles of the evolution of institutions and historical transformations in affecting the *nature* of the antithetical relation between the two is downplayed or absent.** Interestingly, Regulation theory, which is certainly the theoretical framework that has stressed the influence of institutional and technological change on competitive dynamics the most, also fails to appreciate how this influence can alter the nature of the link between competition and market power. Indeed, Regulation Theory considers ‘competitive’ and ‘non-competitive’ periods in history that are the result of historical institutional transformations in institutions, but in all cases market power is the denial of competition; institutions change over time and give market power more or less relevance *over* competition.

In this thesis we have shown that, on the contrary, history not only transforms the conditions under which competitive and market power mechanisms are exerted, resulting in variations in the degree of market power; it also transforms the very nature of the link between competition and market power. When analyzing the Collusive competition era (circa 1870s to 1910s) we saw how institutional transformations such as the literalist interpretation of the Sherman Act and the introduction of the shop-right doctrine, as well as the technological revolution of the age of heavy engineering, led to the use of horizontal integration and patents as mechanisms of horizontal market power that were aimed at regulating competition through collusion, not hindering it. This was due to the experience of the previous Predatory competition era (circa 1840s 1860s) in which excessive competition had proven to be ruinous for firms. In absence of effective institutions that would regulate competition to avoid the effects of predatory competition, firms used horizontal market power to regulate competition. Nevertheless, lacking barriers to entry, they failed to a large extent in their endeavor. When, during the Constricted competition era (circa 1920s to 1945), other institutional transformations such as the rule of reason interpretation of the Sherman Act or the recognition of the ownership of employees’ inventions by the firm in the labor contract gave firms the possibility of integrating vertically and using patents as barriers to entry respectively, market power quickly became a mean to constrict competition. **In other words, an institutional and technologically-driven change that increased market power led to a qualitative**

transformation of the nature of its link with competition: it passed from regulating it to constricting it.

Similarly, we saw in Chapter I how the ICT revolution, the expansion, reinforcement and homogenization of the IP regime and the liberalization of trade gave birth to a new type of firm, the internationally-dispersed network-firm or ‘global value chain’. We showed (cf. Chapter III) that market power is the backbone of the network-firm in that it allows for the coordination of production within it, articulating in that manner competition between network-firms. At the same time, market power is the foundation of an uneven distribution of profits within the network-firm. Once again, institutional and technological transformations, as well as the subsequent organizational transformation the emergence of the (internationally-dispersed) network-firm represents, gave birth to a new type of link between market power and competition in which the former articulates the latter. The same conclusion can be drawn from the findings of Chapter IV regarding trust-based algorithmic coordination (TBAC) firms. The ICT revolution also allowed for this new type of firm; its appearance, in conjunction with the regulatory regimes applying to the data produced by these platforms, led to a competitive dynamic in which market power articulates competition. Indeed, the efficiency of algorithmic-coordination in winner-takes-all markets give TBAC firms market power, which they use both to extract more value from platform users and to algorithmically coordinate the fierce competition they are entangled in with TBAC and traditional firms.

Market power can be based on the capacity to efficiently coordinate production... and this gives it the possibility to coordinate competition

We have seen in Chapter II how most competition theories conceive market power as an obstacle to competition. The exception is Transaction Costs Theory (TCT), which also recurs to what we have labelled ‘positional market power’, a term that refers to the strategic obtainment and usufruct of a particular link with other agents as a result of multilateral strategic choices by all of the agents *in a competitive context*. Nonetheless, positional market power as described by TCT depends on relationship lock-in, which is a particular situation of opportunism that cannot account for long-term and sustained market power. Moreover, when positional market power as described by TCT is exerted, prices depart from their competitive level and, therefore, competition is hindered. This shows that the existing competition theories can only conceive competition as antithetical to market power.

In Chapters I, III and IV we have shown that, on the contrary, market power can act as a coordinator of competition. In order to do so, we have focused on two organizational objects: global value chains and TBAC firms. While they differ in terms of competitive dynamics and the nature of the firm, there is a source of market power that is common to both: the ability to efficiently coordinate competition. We saw (cf. Chapter III) how in global value chains the firms that have more market power are those that are more central in the network(-firm). The centrality of a firm within the network-firm, in turn, translates how essential the former is to the overall production process carried on by the network-firm. This gives certain lead firms the capacity to coordinate the process of the network-firm and, as a consequence, fully vertical market power to extract more of the value created by the network-firm than other participants firms. But, at the same time, being essential to the overall production process also means being essential to resist network-firm vs network-firm competition by assuring that the network-firm can produce at a price similar to that of competing network-firms. **As a result, competition between network-firms is fierce because some firms exert market power within each network-firm and, inversely, market power exists because competition is fierce.**

In Chapter IV, we saw that algorithmic coordination is a source of efficiency that allows TBAC firms to conquer winner-takes-all markets. This, in turn, is a source of market power they exert on (some) users of the platforms to increase their profits, but also to coordinate competition with other TBAC firms. For example, we saw how the efficiency brought about by Uber's ability to algorithmically coordinate ride-hailing is making it the leader in most American ride-hailing markets. This, in turn, gave it market power it used, on the one hand, to raise the commission it takes from drivers, increasing so its profits. On the other hand, it used it to impose work conditions (mainly monetary rewards) to drivers that make Uber more attractive for riders than other competing platforms such as Lyft. In that manner, just as in the network-firm, in TBAC firms market power coordinates competition, establishing so a synergic relationship with it.

The analysis of the competitive dynamics of these two organizational objects shows that, contrary to what all competition theories argue, market power is not necessarily antithetical to competition; it can also be a mean of coordinating it and, in doing so, it establishes a synergic relation with it. **Understanding this synergic relation between competition and market power provides a theoretical explanation for the coexistence of the two seemingly incompatible stylized facts that triggered this investigation: long-run profit rate differentials and strong price competition. It is because market power can coordinate competition that we can have strong competition on prices (Uber's price wars with Lyft, network-firms competing strongly on price) and, at the same time, an increasingly uneven**

distribution of profits between the participants of the value creation process (Uber and drivers, lead firms and other firms of the network-firm).

Conceiving market power as a coordinator of competition implies setting aside visions of the former as an obstacle to the latter in favor a vision of positional market power. Nonetheless, contrary to the positional market power mechanisms described by TCT, which are all based on relationship lock-in, the positional market power mechanisms we have described in the cases of network-firms and TBAC firms can conciliate the existence of long-run profit rate differentials and competitive pricing. This is due to the fact that, when the positional market power mechanisms we have described take place, they do not annul competition, they *enable* it. In both cases we have an usufruct of a particular link with other agents in a competitive context but, while in TCT this usufruct (the exertion of marker power) implies driving away from the competitive price, in ours the exertion of market power is the counterpart of market power enabling the selling of the final product or service at a competitive price.

Limitations and future lines of research

This thesis represented a first step towards a theoretical reconsideration of the link between competition and market power that departs from the traditional understanding of the two as being antithetical. We have just highlighted the main original findings it led to. Nonetheless, our work contains some limitations that are worth mentioning in order to bring out future lines of research that we hope we will have set.

Limitations

In **Chapter III** we have offered a contribution to a theory of competition and market power between and within global value chains that rests on the idea that a firm's market power within a network-firm depends on its centrality relative to other firms'. We showed how this can be theoretically compatible with strong competition on prices and we used simple numerical examples to illustrate it. The theory is in accordance with existing case studies in the global value chains literature.

Nevertheless, because of the theoretical focus of this thesis and the difficulty of finding the necessary firm-level data, no corroboration of the theory could be made by looking, for a given network-firm, for correlations at the firm-level between indicators of relative centrality, on the one side, and profit rates or value retained, on the other side. Consequently, the results of Chapter III, although theoretically consistent and in line with the findings of the literature that has carried on case studies of global value chains, are not empirically robust.

In **Chapter IV**, on the contrary, we had access to (imperfect) data to successfully corroborate our theory by doing a case study of Uber. Nevertheless, three important limitations of this corroboration have to be kept in mind. First, it is geographically circumscribed to the main United States' markets. Different conclusions could have been made had we had data for other countries. Some characteristics of other countries, such as the existence of cultural differences in the way the population uses ride-hailing platforms, a different supply of platform and non-platform services or particular regulations regarding transportation could alter the conclusions. Second, our empirical study focused on the ride-hailing market. Nevertheless, TBAC firms comprise a variety of heterogeneous industries that we have not explored empirically such as lodging or personal care. The results we have found might change if we test them in other industries. Third, the object of study, TBAC firms, is still rapidly evolving. The tendencies we have identified in Chapter IV such as the winner-takes-all dynamic might change as TBAC firms and especially their environments evolve. Regarding the two latter limitations, it is worth noting two recent major regulatory changes at the European level might affect our conclusions: the European Union's General Data Protection Regulation, which, among other things, will allow for data portability from May 25th 2018 on, and the recent European Court of Justice's classification of Uber as a transportation service, which might make the regulations that apply to ride-hailing platforms stricter.

Future lines of research

We can identify three main future lines of research. One follows from the limitations of our work we have presented and two are derived from the main original findings of this thesis.

A wider empirical corroboration of our theories of competition and market power

As said above, the theoretical approach chosen for the thesis, the limitation to a single case study in the case of Chapter IV and, in some cases, the lack of data, have left room for a future line of empirical research aimed at corroborating our findings to a larger extent. This could lead to nuancing or reinforcing our conclusions as well as to refining our theoretical findings. Other possible positive outcomes of this research would be the development of new indicators of market power compatible with our notion of positional market power in which competition is coordinated by market power.

Consequences for antitrust

In this thesis we have focused on competition theory. Although we have treated antitrust mainly in Chapter I while studying the history of forms of competition in the United State, we have not explored the consequences of our findings for antitrust.

Because antitrust is necessarily based on competition theory, and, as we have shown, every competition theory conceives the exertion of market power as the annulment or hindering of competition, conceiving situations in which market power can coordinate competition (i.e. make it operational) would imply rethinking the role and the modes of action of antitrust in those cases. Should antitrust authorities abstain from intervention in cases in which vertical market power allows for the coordination of a strong price competition that assures consumers low prices? Would this type of market power have harmful consequences for innovation in the long-run? If so, would this justify the intervention of antitrust even if it implies higher consumer prices in the short-run? Moreover, while studying competitive dynamics related to TBAC platforms in Chapter III, we have arrived to two conclusions that would be worth developing in future research. The first one is the idea of large enough amounts of data being an essential facility. If this is the case, the conditions of application of the essential facility doctrine to data would require further investigation. Some important issues to explore in that vein are the definition of which actors should have access to which data and on which conditions, the compatibility of the application of the essential facility doctrine with other regulations that might apply to data (e.g.: right to privacy) or the link with data portability rights that the recent General Data Protection Regulation has granted in the European Union. The second one is predatory pricing by TBAC platforms. A proper investigation on the existence and the extent of predatory pricing practices by TBAC would require more data and it would be interesting to apply it to several markets in which TBAC firms participate.

A wider study of the relation between competition and market power in the platform economy

Following the two main original findings exposed above, we can see that the ICT revolution and some complementary institutional transformations have altered the nature of the link between competition and market power by turning it into one in which competition is coordinated by market power, making it possible for price competition to prevail in harmony with increasing market power. As the digitalization of production and consumption expands, we can only expect this particular nature of the link between market power and competition to be reinforced in the organizational objects we have studied (the network-firm and TBAC firms) and to expand to other domains.

This tendency is particularly relevant for the platform economy of which, as shown in Chapter IV, TBAC firms are part. It would be interesting to carry on studies similar to the one we did in that chapter to understand which competition and market power dynamics are to be expected in other types of platform-firms and what regulatory or antitrust answers would be desirable. This would imply a first etiological work aimed at characterizing from an evolutionary perspective of the firm other types of platform-firms and analyzing the role data plays in terms of (anti)competitive dynamics. In which type of platform-firms does the user feedback loop operate? Can we expect data to be an essential facility in all of them? What role do multisided markets factors such as switching costs play in other types of platform-firms?

These interrogations raise the issue of the sustainability of the synergic relation between competition and market power in which the latter coordinates the former. If, as we suggested in Chapter IV, markets in which TBAC firms participate are winner-takes-all markets, we should expect, in absence of new regulation or antitrust remedies, prices to raise and competition to be hindered in the future. Then, contrary to what happens in the case of global value chains, the synergic relation between market power and competition would be ephemeral. However, the results we found by focusing on TBAC firms cannot be extrapolated. We hope the approach we have taken in Chapter IV will set good bases to further explore these issues in the rest of the platform economy.

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Titre de la thèse

Concurrence et pouvoir de marché : une reconsidération critique à la lumière de changements récents

Résumé

Les objectifs principaux de cette thèse sont expliquer l'émergence de nouvelles dynamiques concurrentielles caractérisées par une symbiose entre concurrence et pouvoir de marché et élucider comment elles peuvent être appréhendées sous l'angle de la théorie de la concurrence. Le **chapitre I** investit l'évolution des formes de la concurrence aux États-Unis de 1840 jusqu'à nos jours. On montre qu'alors que dans certains cas le pouvoir de marché s'est traduit par l'entrave à la concurrence (et vice-versa), dans d'autres les deux établissent une relation symbiotique. Le **chapitre II** fait une revue des théories de la concurrence et conclut qu'elles ne rendent pas compte de la coexistence de deux faits stylisés majeurs propres à la forme de concurrence hégémonique actuelle : des différentiels de taux de profit de long terme et une forte concurrence par les prix.

Le **chapitre III** développe une contribution à la théorie de la concurrence entre et au sein des chaînes globales de valeur (CGV). On montre que l'interdépendance inégale est la source du pouvoir de marché intra-CGV, ce qui explique les différentiels de taux de profit entre firmes appartenant à une même CGV. On montre par la suite comment ils peuvent être compatibles avec une forte concurrence par les prix. Le **chapitre IV** étudie le capitalisme de plateforme en se focalisant sur les « firmes de coordination algorithmique basées sur la confiance » (FCABC). En s'appuyant sur le cas de la firme de VTC Uber, on argumente que la FCABC conjugue du pouvoir de marché avec une forte concurrence par les prix dans une dynamique concurrentielle dans laquelle il y a une tendance à la monopolisation.

Mots clés

Concurrence ; Pouvoir de marché ; Chaînes globales de valeur ; Firme-réseau ; Plateformes ; Winner-takes-all

Title of the thesis

Competition and market power: a critical reassessment in light of recent changes

Abstract

The main objectives of this thesis are to explain the emergence of competitive dynamics characterized by a symbiosis between competition and market power and to elucidate how they can be apprehended through the lenses of competition theory. **Chapter I** investigates the evolution of forms of competition in the United States from 1840 to today. We show that while in some cases market power has translated into hindering competition (and vice versa), in others the two establish a symbiotic relation. **Chapter II** reviews competition theories and concludes that they do not account for the coexistence of two major stylized facts characteristic of the current hegemonic form of competition: long-run profit rate differentials and strong price competition. **Chapter III** develops a contribution to competition theory within and between global value chains (GVC). We show that uneven interdependence is the source of intra-GVC market power, which explains long-run profit rate differentials between firms belonging to the same GVC. Then we show how they can be compatible with strong price competition. **Chapter IV** studies platform capitalism with a focus on “trust-based algorithmic coordination” (TBAC) firms. Building on the case of the ride-hailing firm Uber, we argue that the TBAC firm conjugates vertical market power with strong price competition in a competitive dynamics in which there is a tendency towards monopolization.

Keywords

Competition; Market power; Global value chains; Network-firm; Platforms; Winner-takes-all